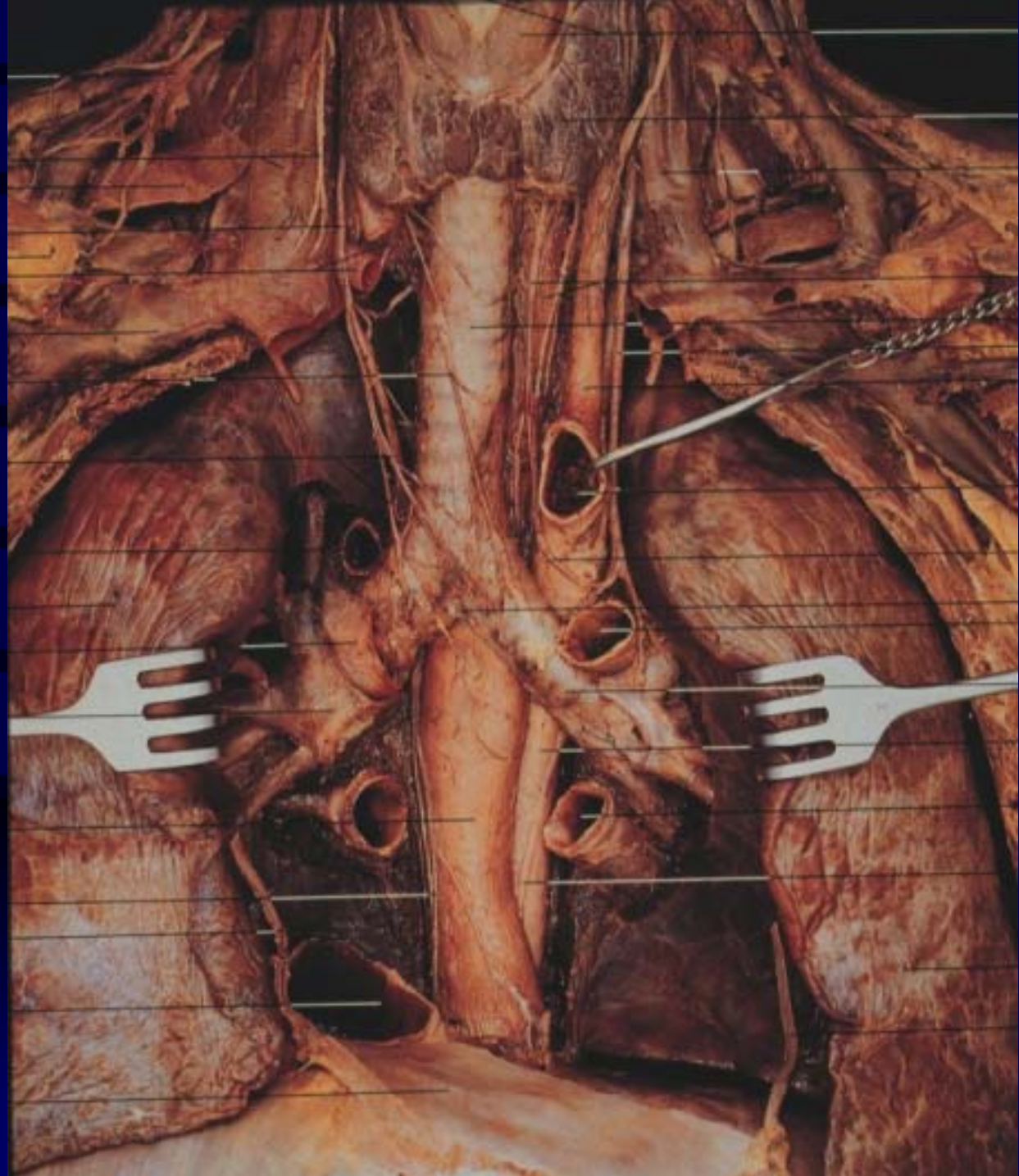
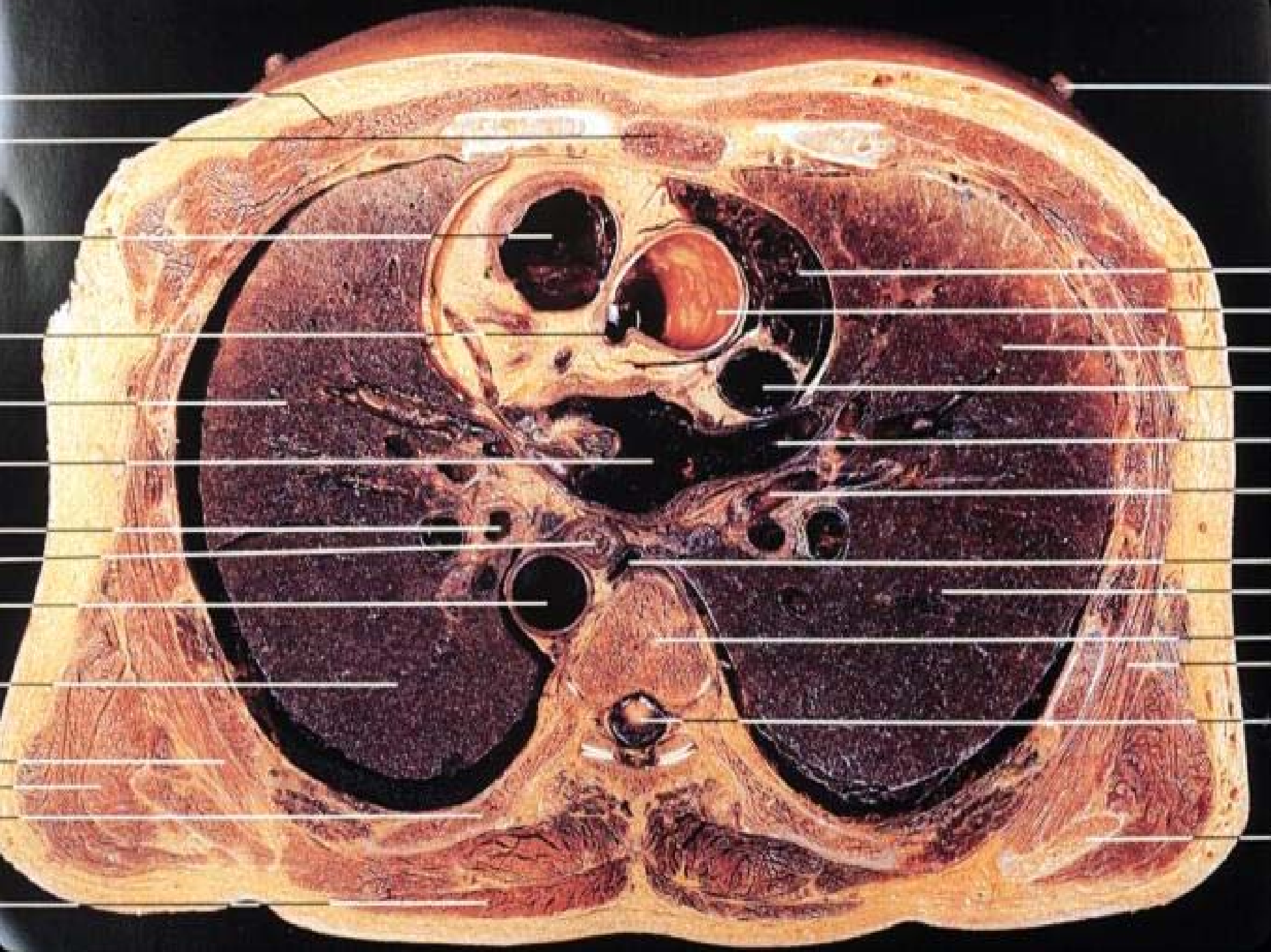
Anatomy of the Chest on Images

David S. Feigin, MD
COL, MC, USA
Professor of Radiology
USUHS



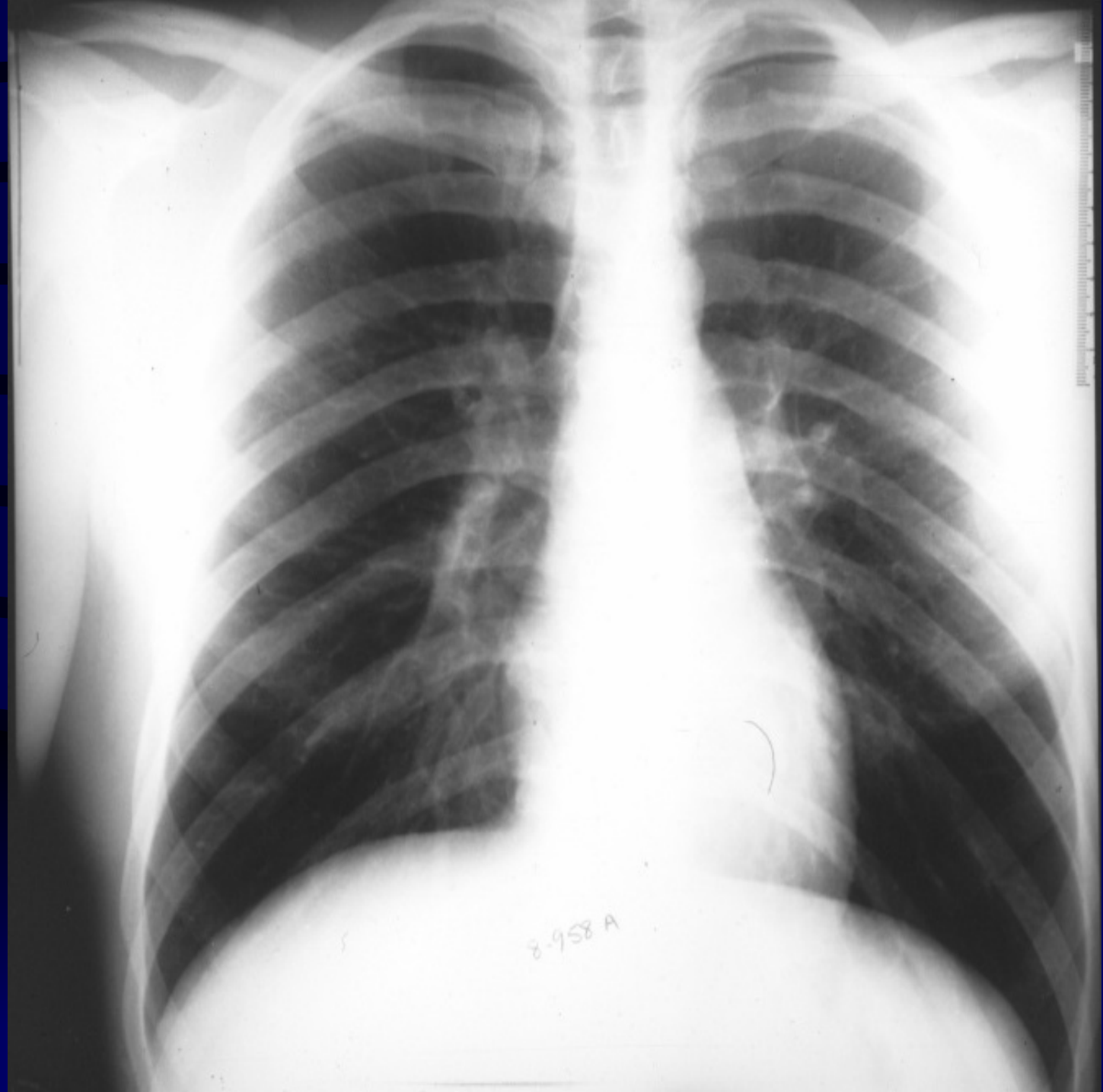


Images for Anatomy

Air in lungs and airways

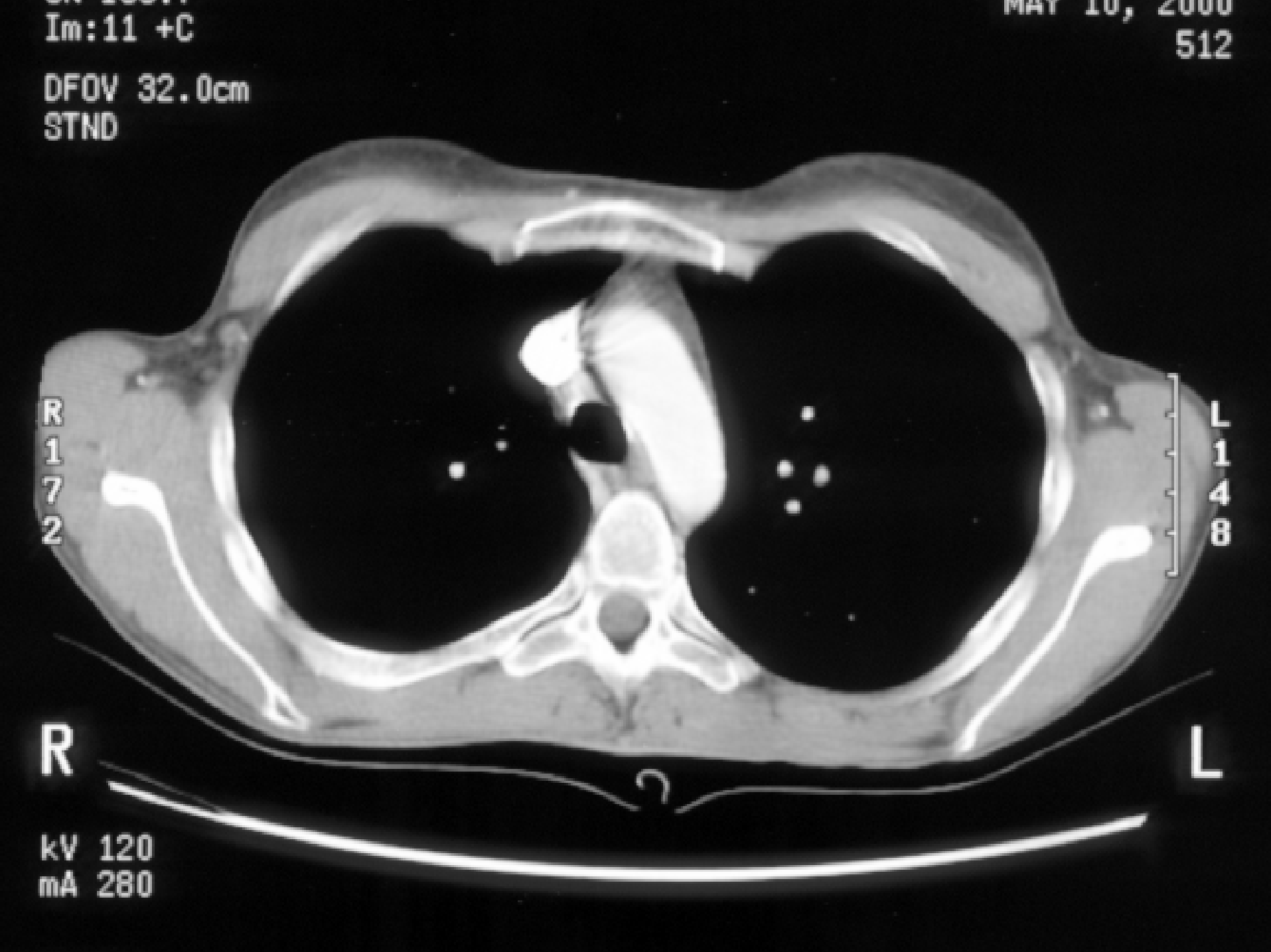
Blood in vessels

Correlation with clinical medicine


8-958 A

Plain Film Densities

- Air
- Soft tissues including fat and blood
- Calcium
- Contrast and metals


Im:11 +C
MAY 10, 2000
512
DFOV 32.0cm
STND
R
172
L
148
R
L
kV 120
mA 280

CT Densities

- Air
- Fat
- Clear fluids and transudates
- Soft tissue including blood
- Calcium
- Metal and Contrast material

Intravenous Contrast makes blood appear as metal

CT for Anatomy of the Chest

- Cross sections
  - eliminate overlap
- More densities
  - more structures visible


SN I117.7
Im:15 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120
mA 280


SN I117.7
Im:15 +C
DFOV 32.0cm
LUNG
MAY 10, 2000
512
R 172
L 148
R
L
kV 120

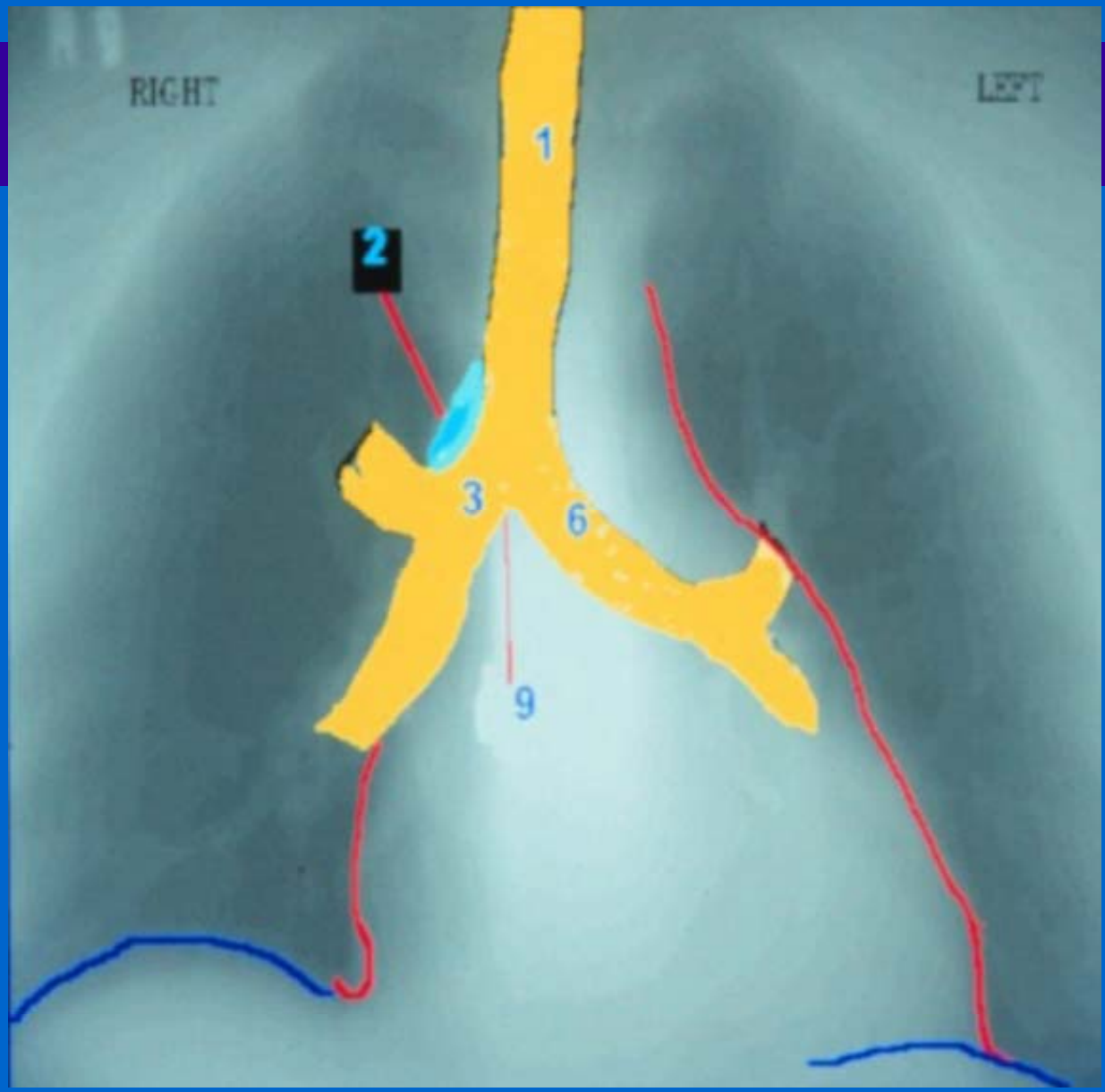
Lungs

- Vessels - pulmonary arteries and veins
  - symmetric
  - branch, taper and diverge
- Fissures
  - visible as watersheds
    (gaps between vessel groups)


SN I117.7
Im:15 +C
DFOV 32.0cm
LUNG
MAY 10, 2000
512
R 172
L 148
R
L
kV 120

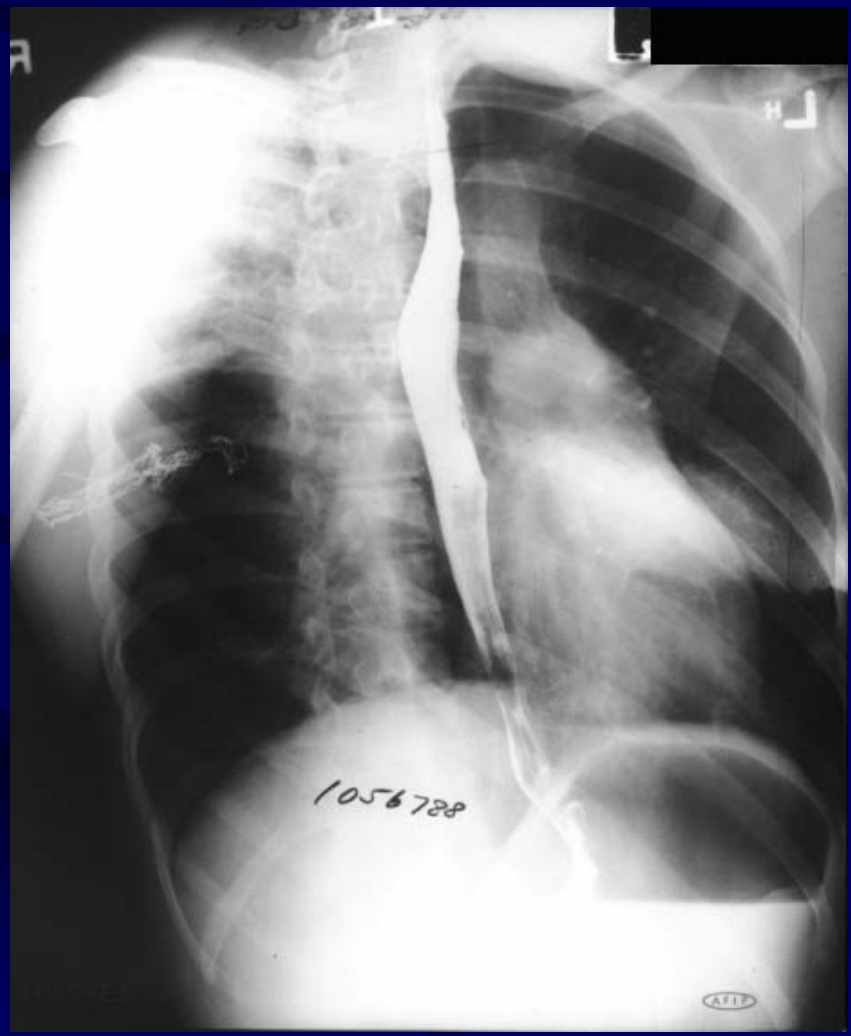
Trachea and Main Bronchi

- Carina - just below aortic arch
- Right bronchus
  - Devides in mediastinum
    - Upper lobe - highest bronchus
    - Intermedius to middle and lower lobes
- Left bronchus
  - Devides in hilum


RIGHT
LEFT
1
2
3
6
9

Esophagus

Posterior to trachea and heart

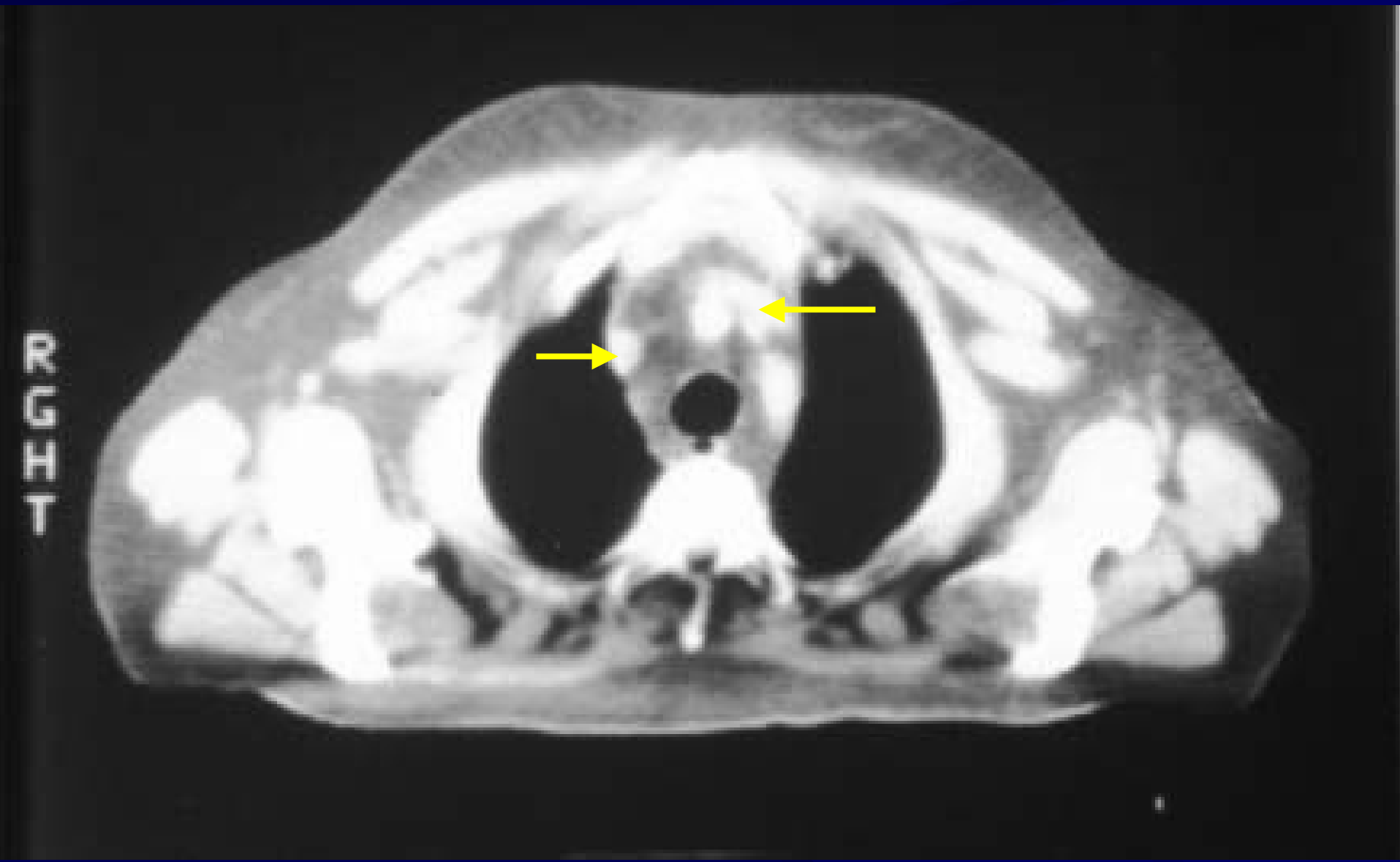


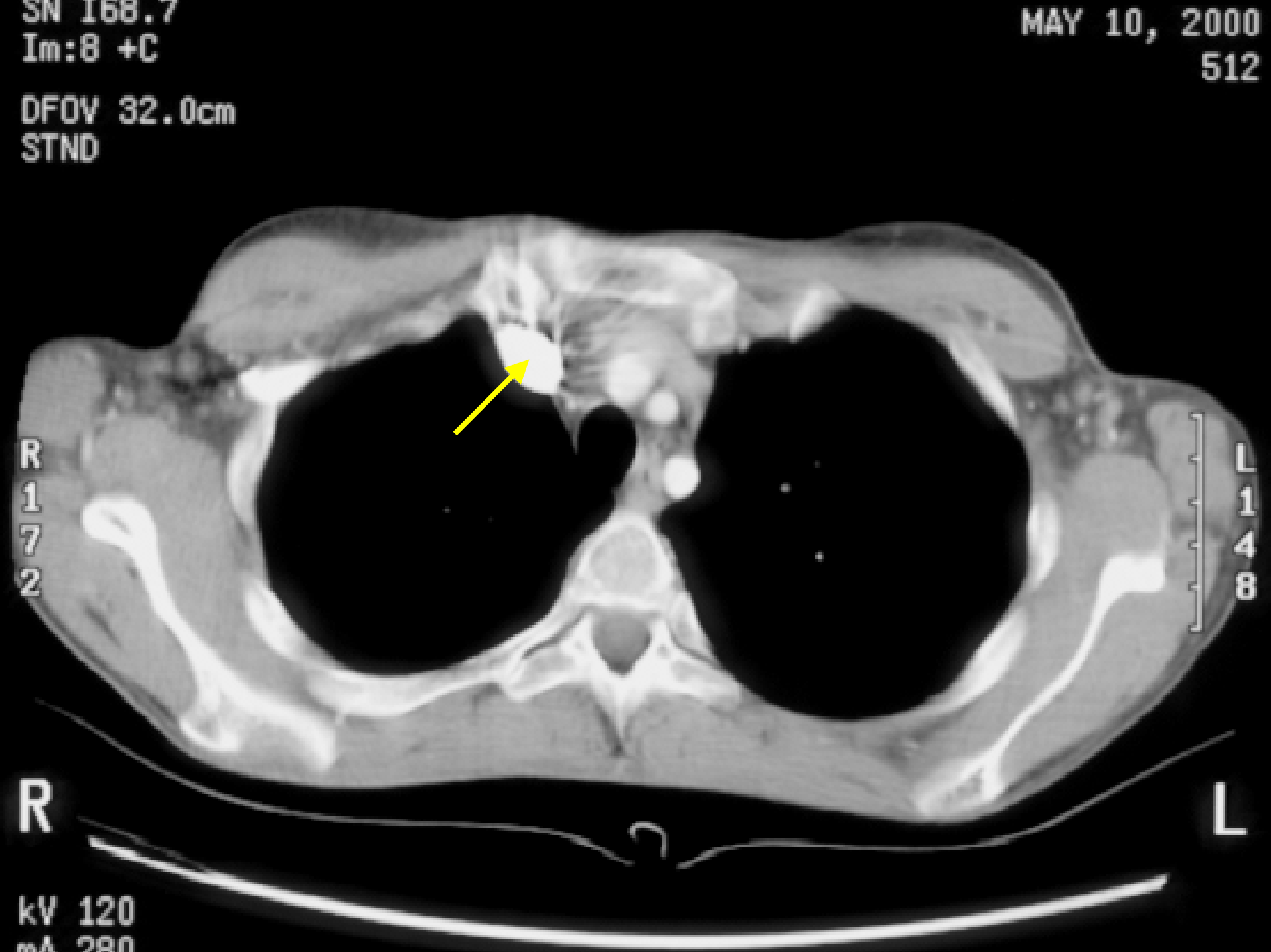
Pathway of Blood in the Chest

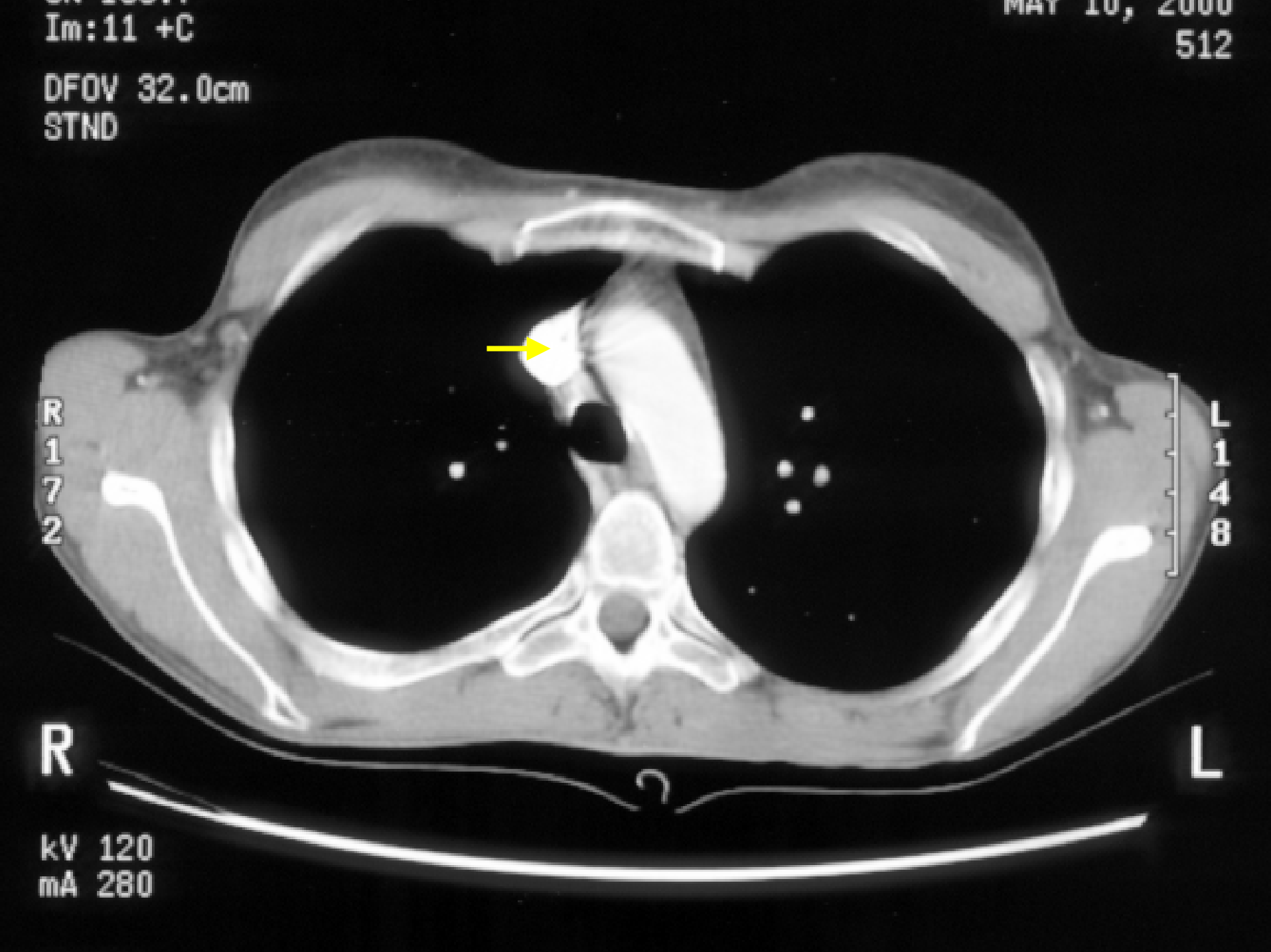
- Systemic veins
- Right heart
- Pulmonary arteries
- Pulmonary veins
- Left heart
- Aorta and systemic arteries

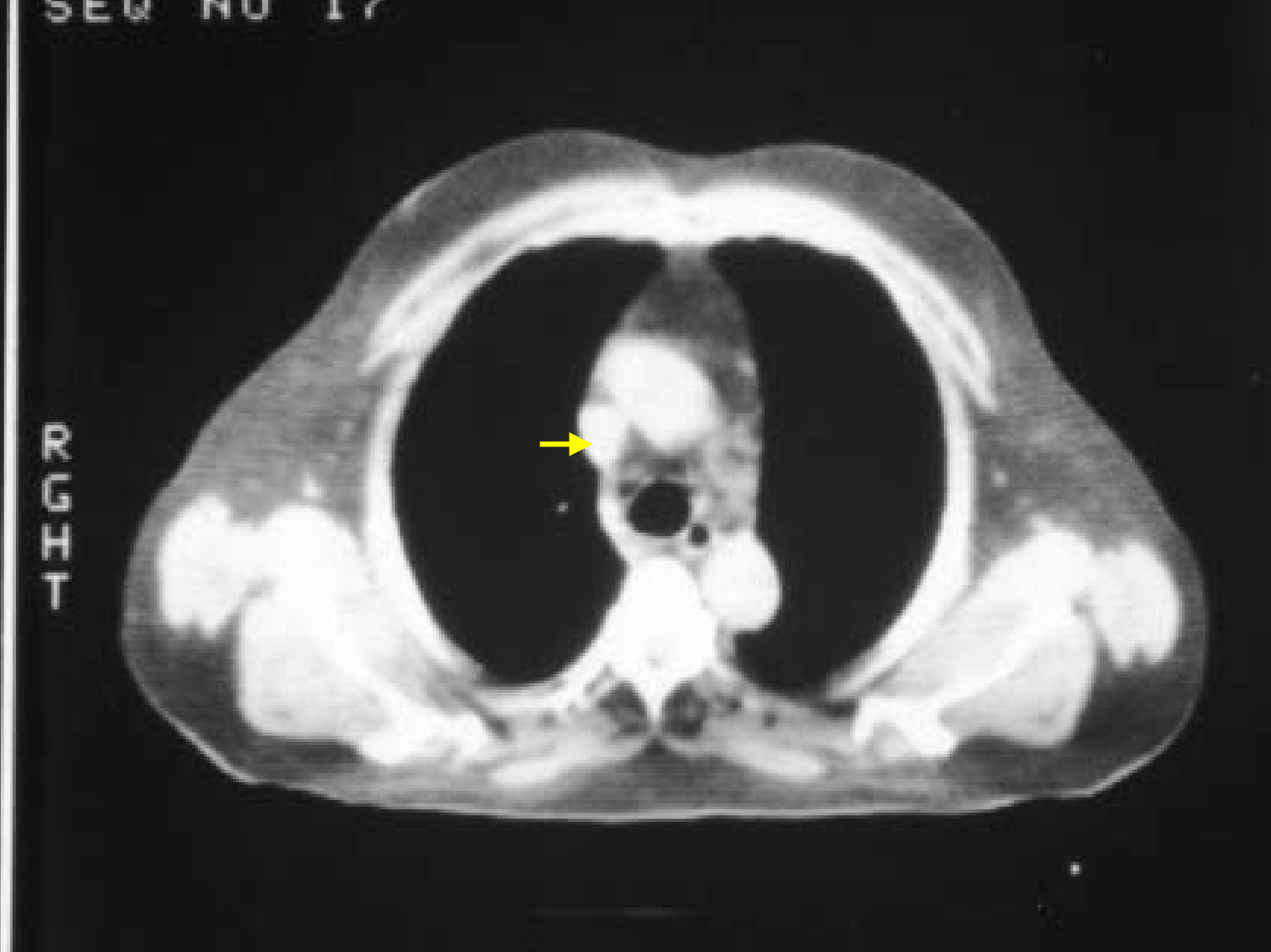
Systemic veins

- Anterior to arteries and trachea
- Right margin of mediastinum
- SVC formed at level of aortic arch by brachiocephalic veins


RGHT

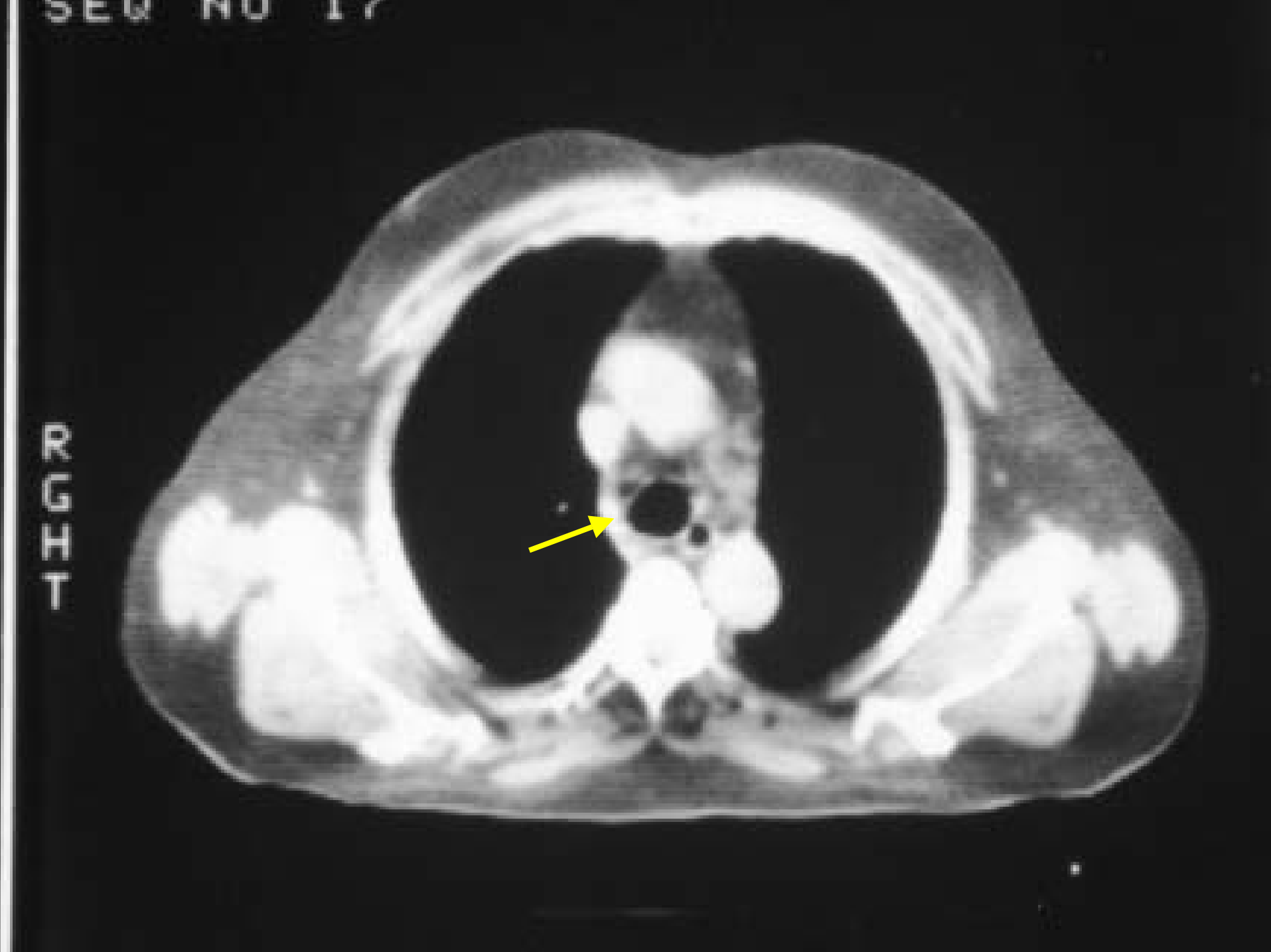

SN I68.7
Im:8 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120

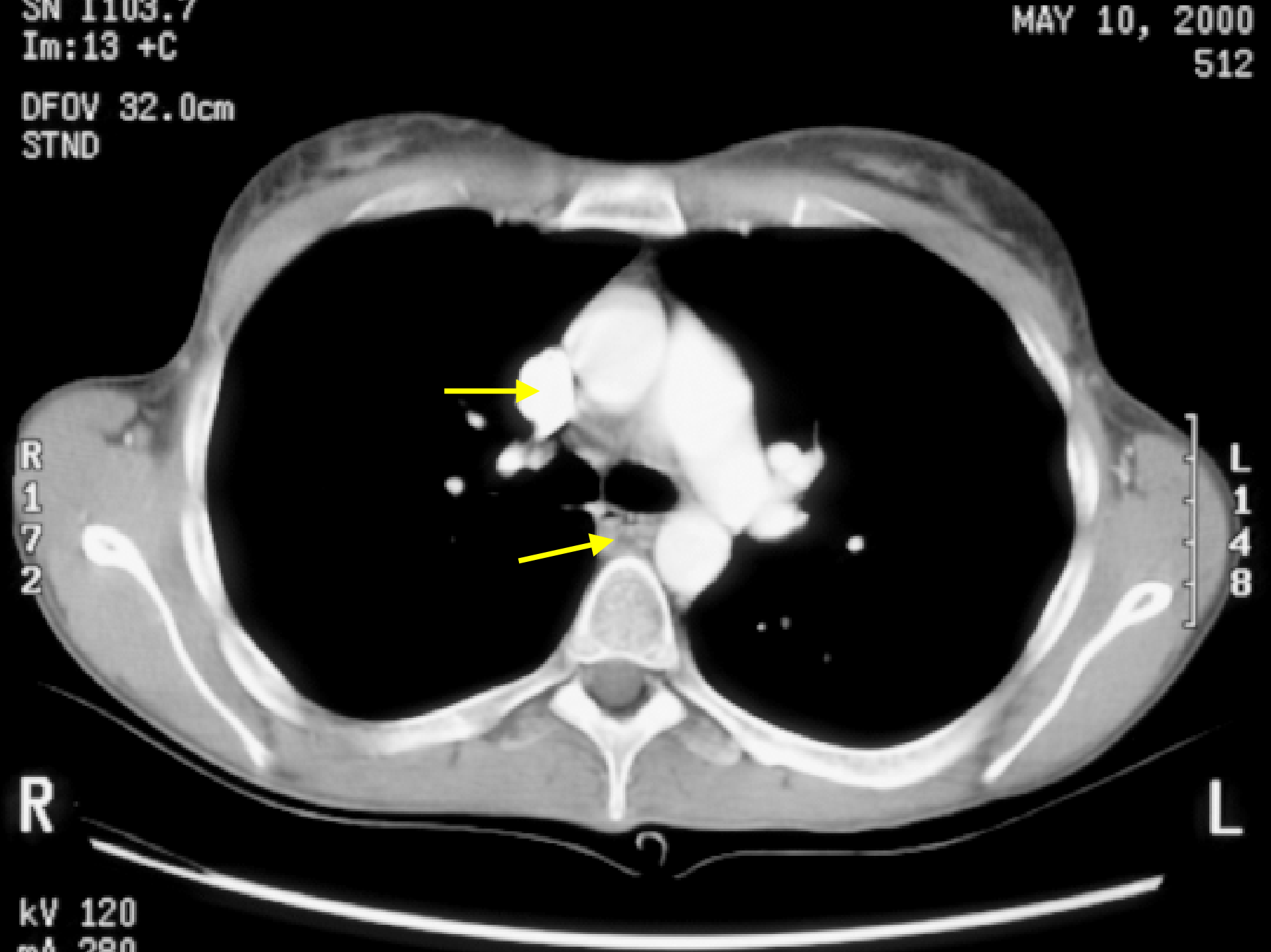

Im:11 +C
MAY 10, 2000
512
DFOV 32.0cm
STND
R
172
L
148
R
L
kV 120
mA 280

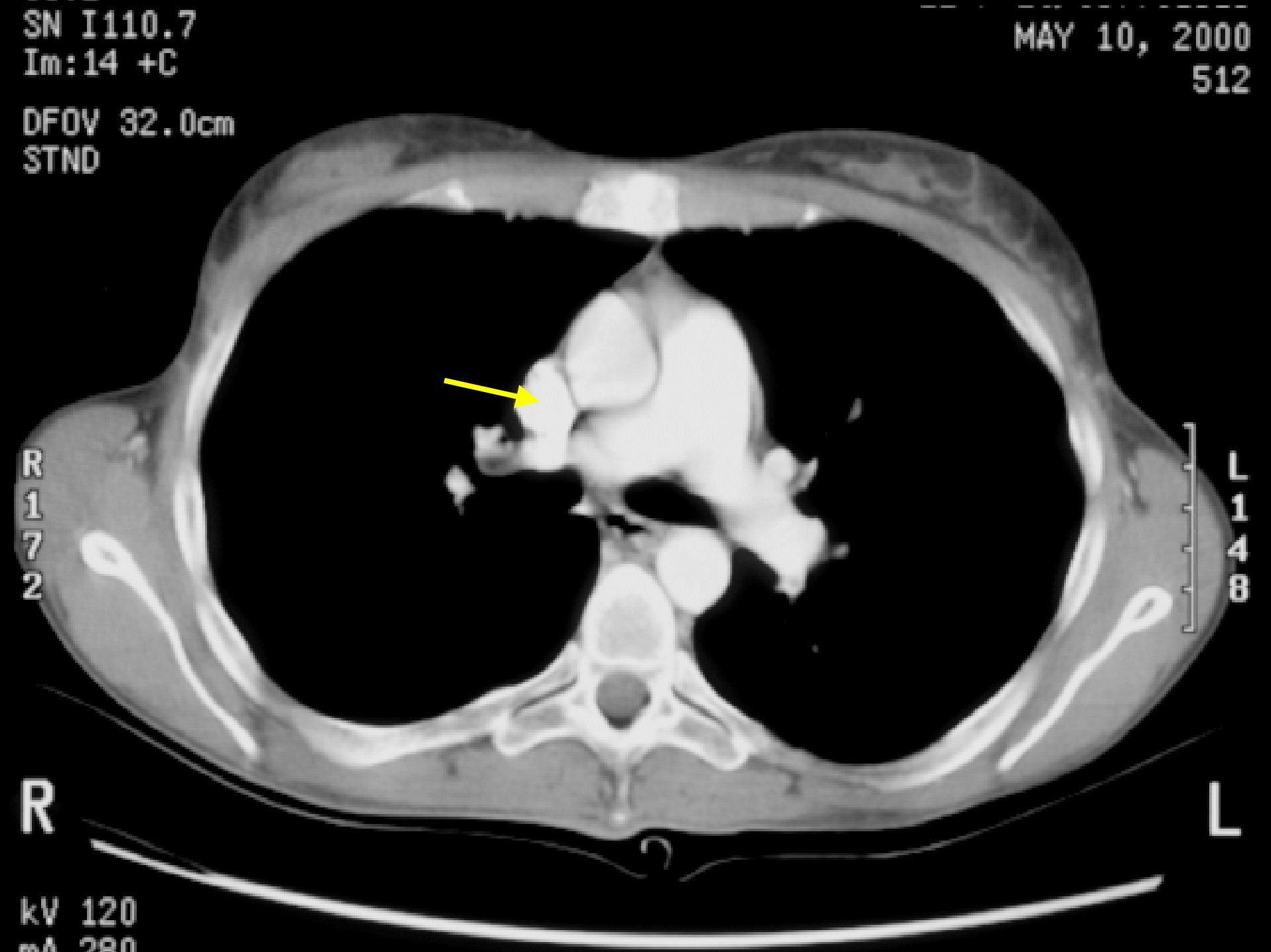

SEQ NO 17
RGHT

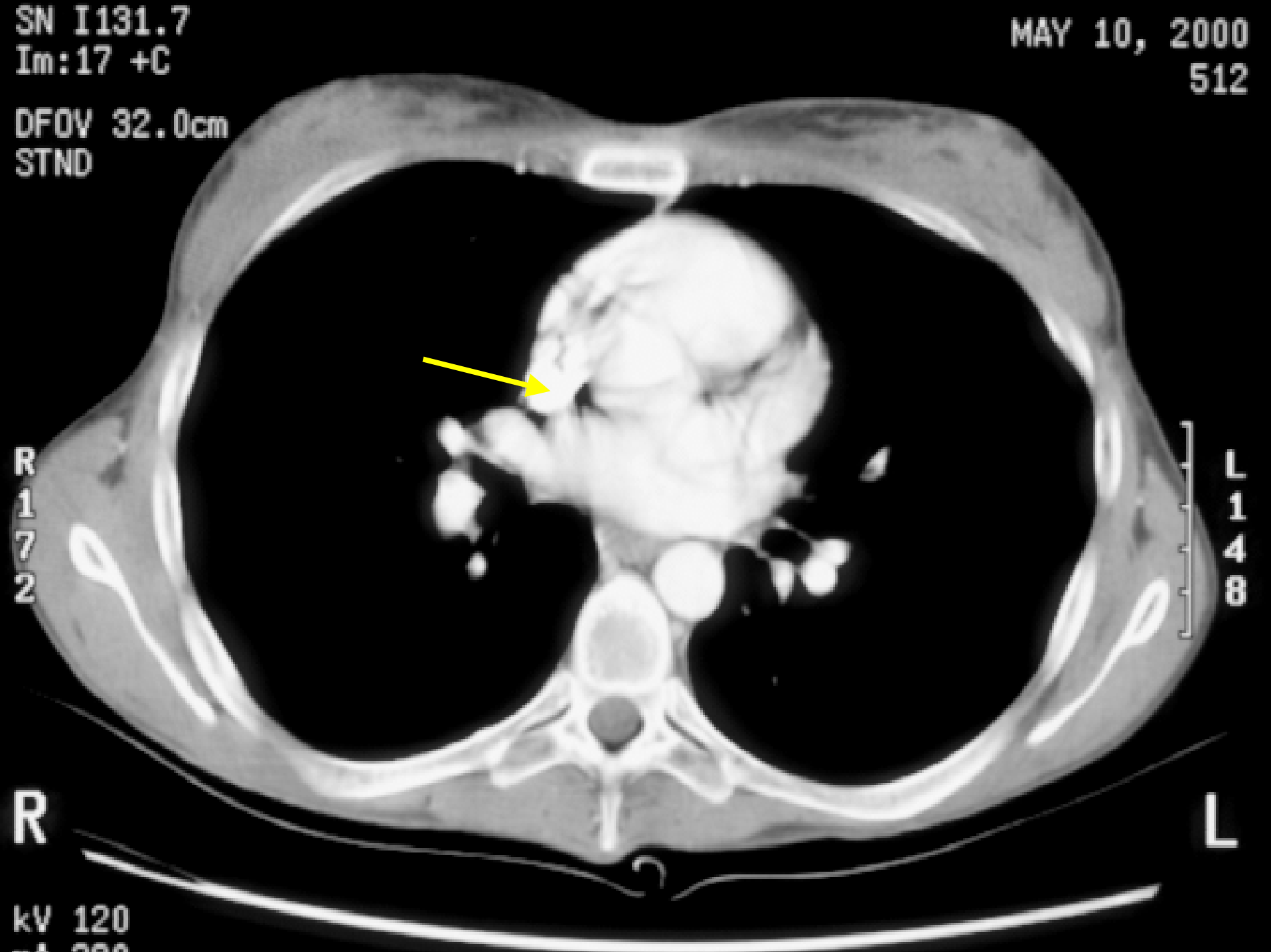
Azygous System

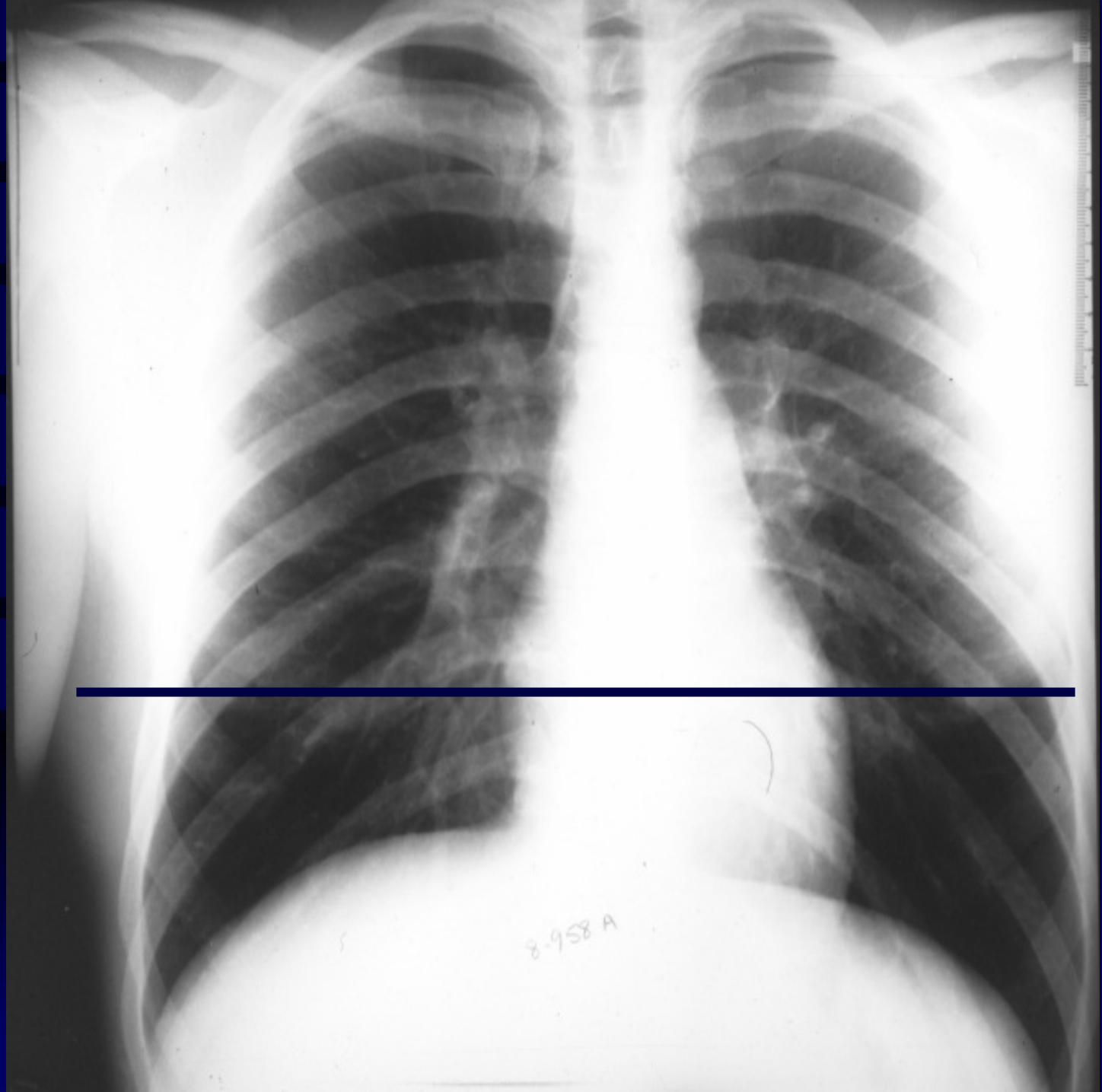
- Arch of azygous
  - enters posterior SVC
  - above right main bronchus
  - around right side of trachea
- Azygous vein
  - right and posterior to esophagus
  - anterior to spine
- Hemiazygous - left

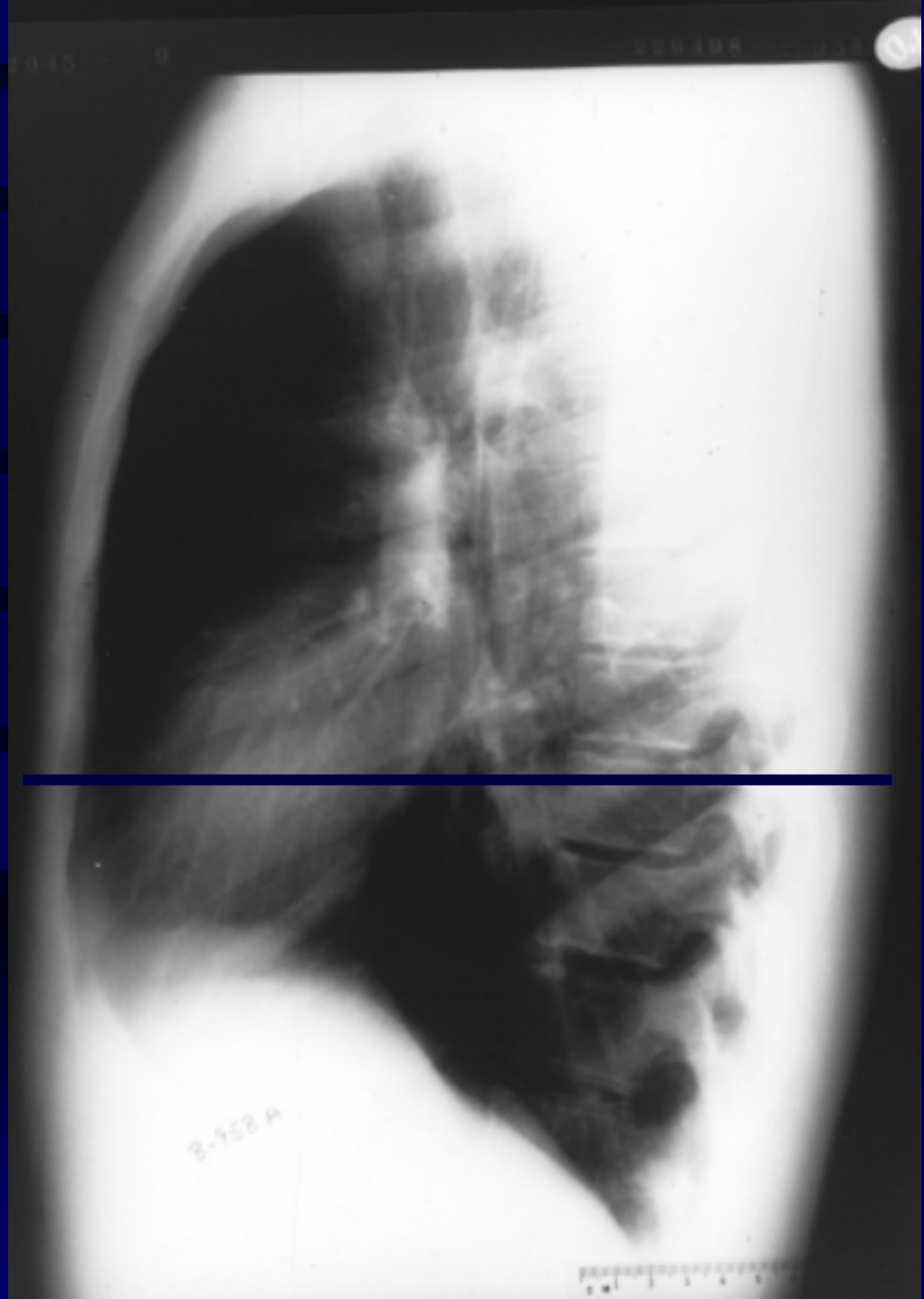

SEQ NO 17
RGHT


SN 1103.7
Im:13 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120


SN I110.7
Im:14 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120

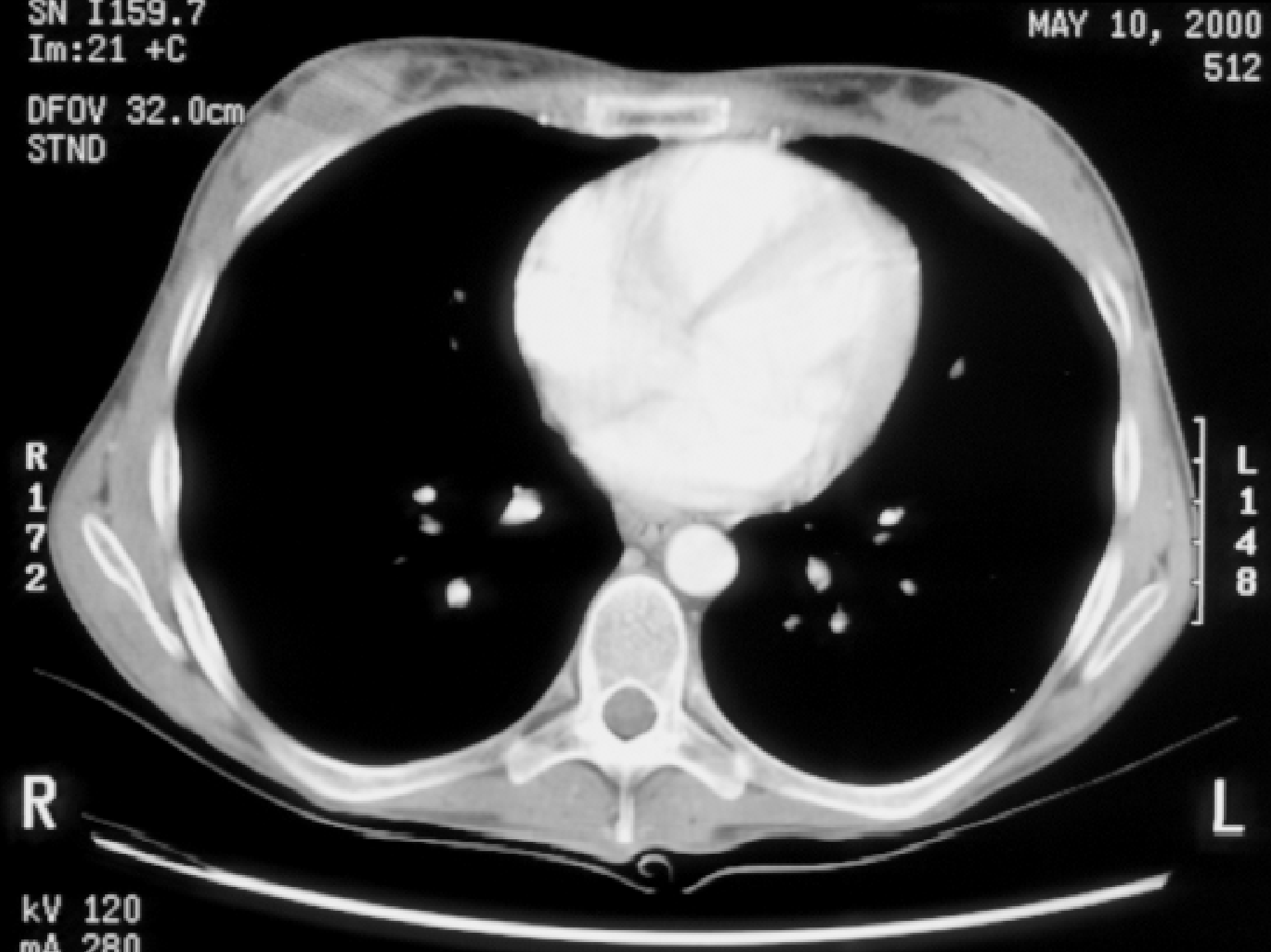

SN I131.7
Im:17 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120

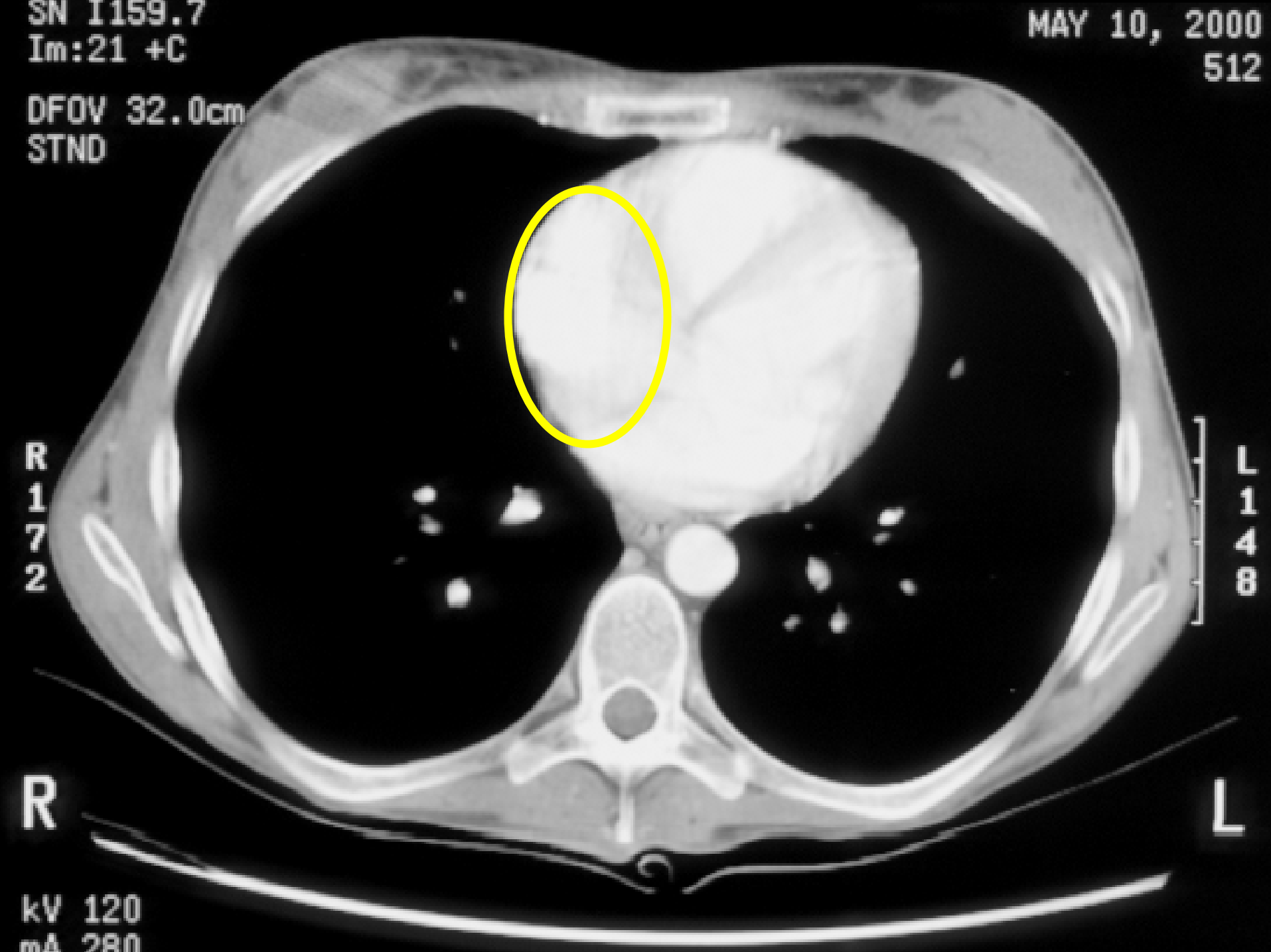

8-958 A

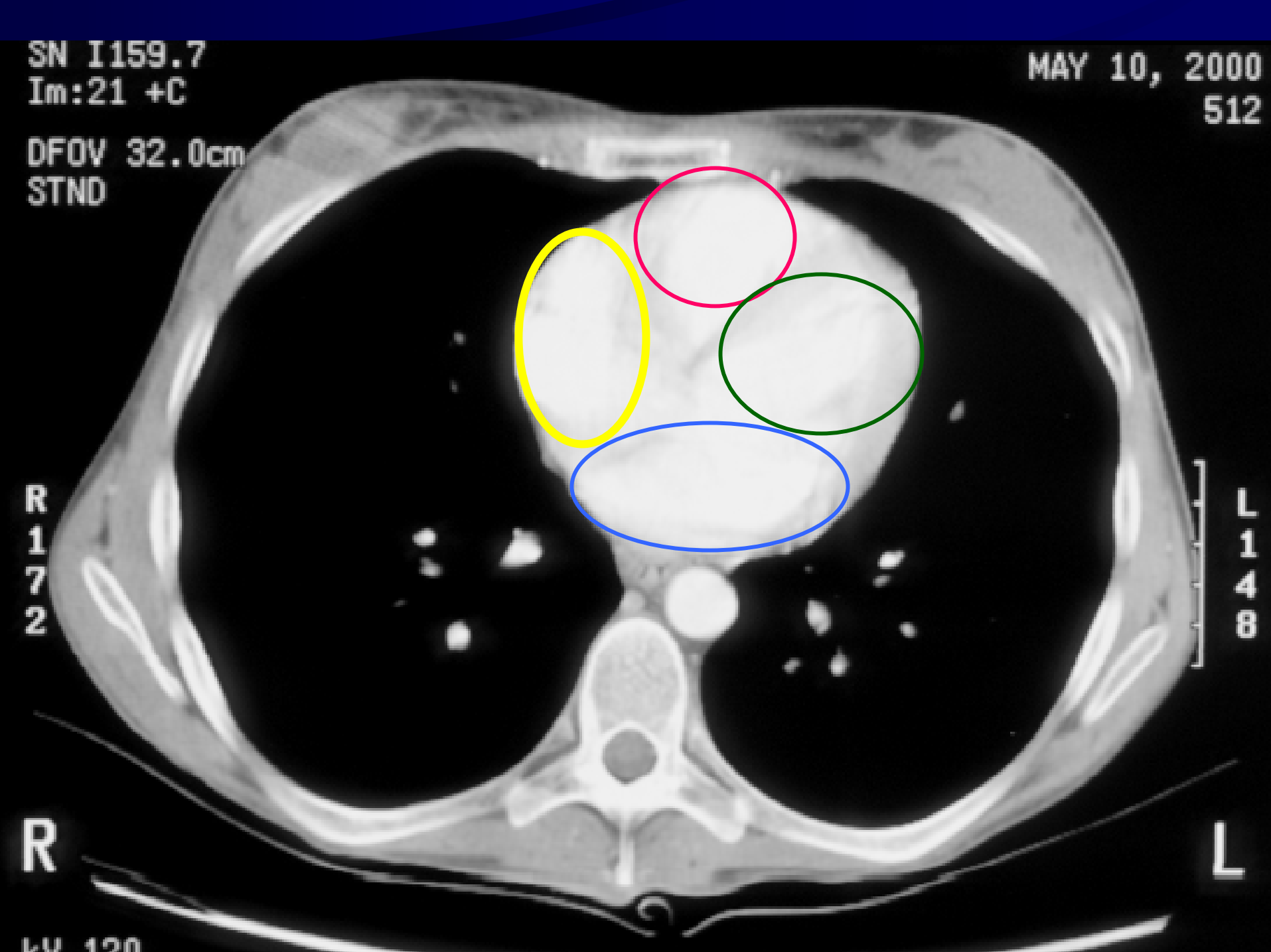


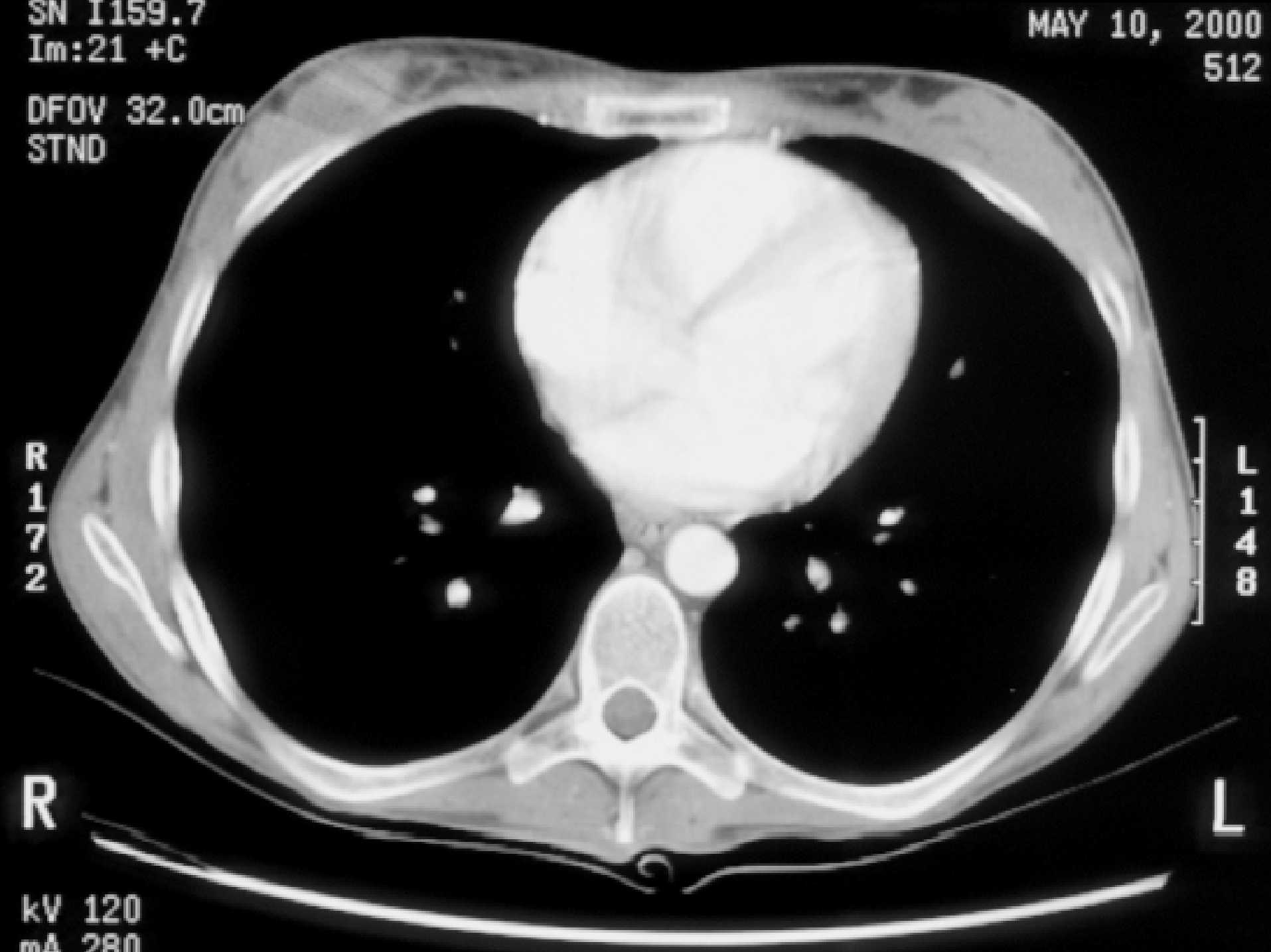
Right Atrium

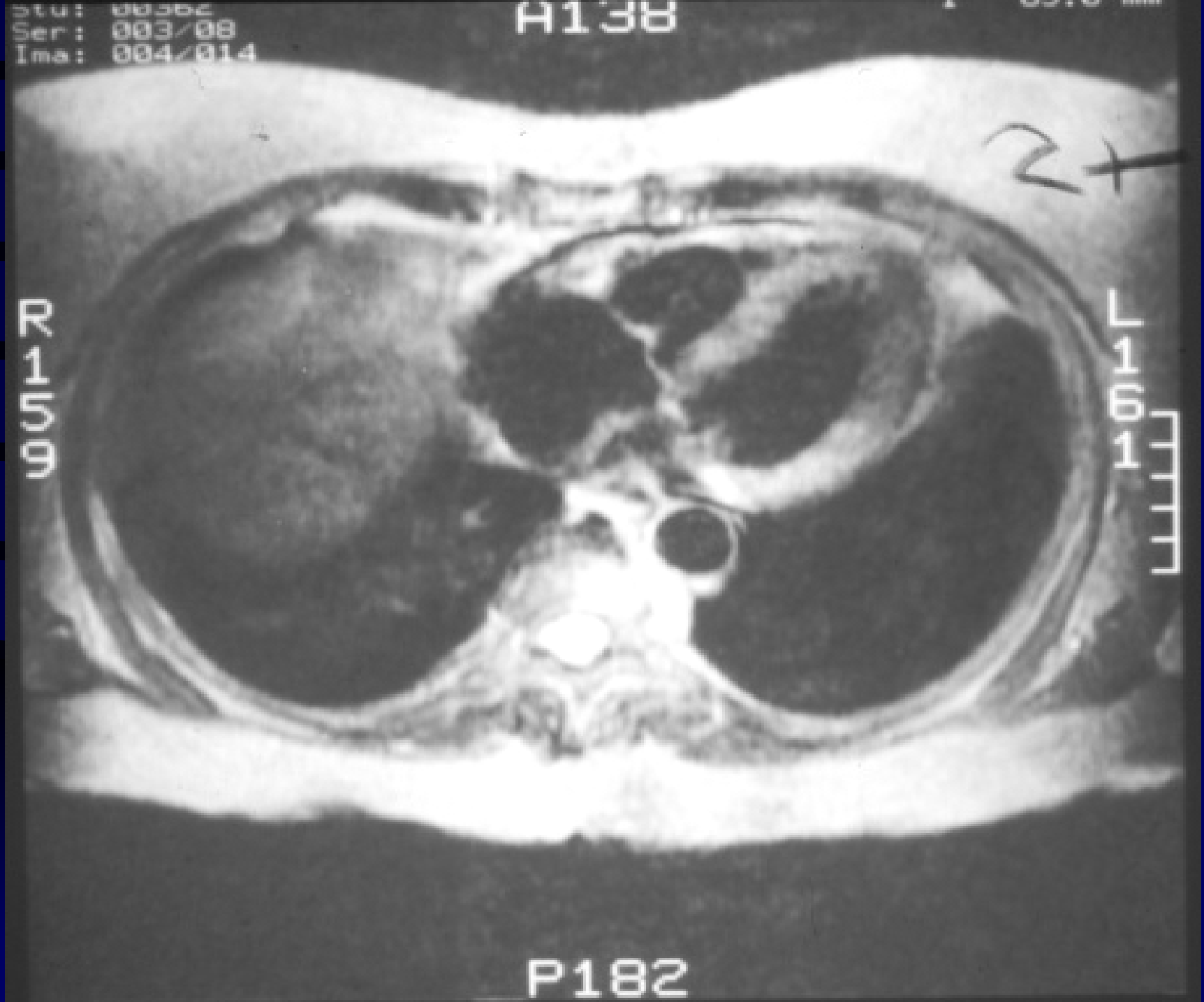
- Entire right heart border
- IVC enters inferior aspect
- SVC enters superior aspect


SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120
mA 280


SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120
mA 280

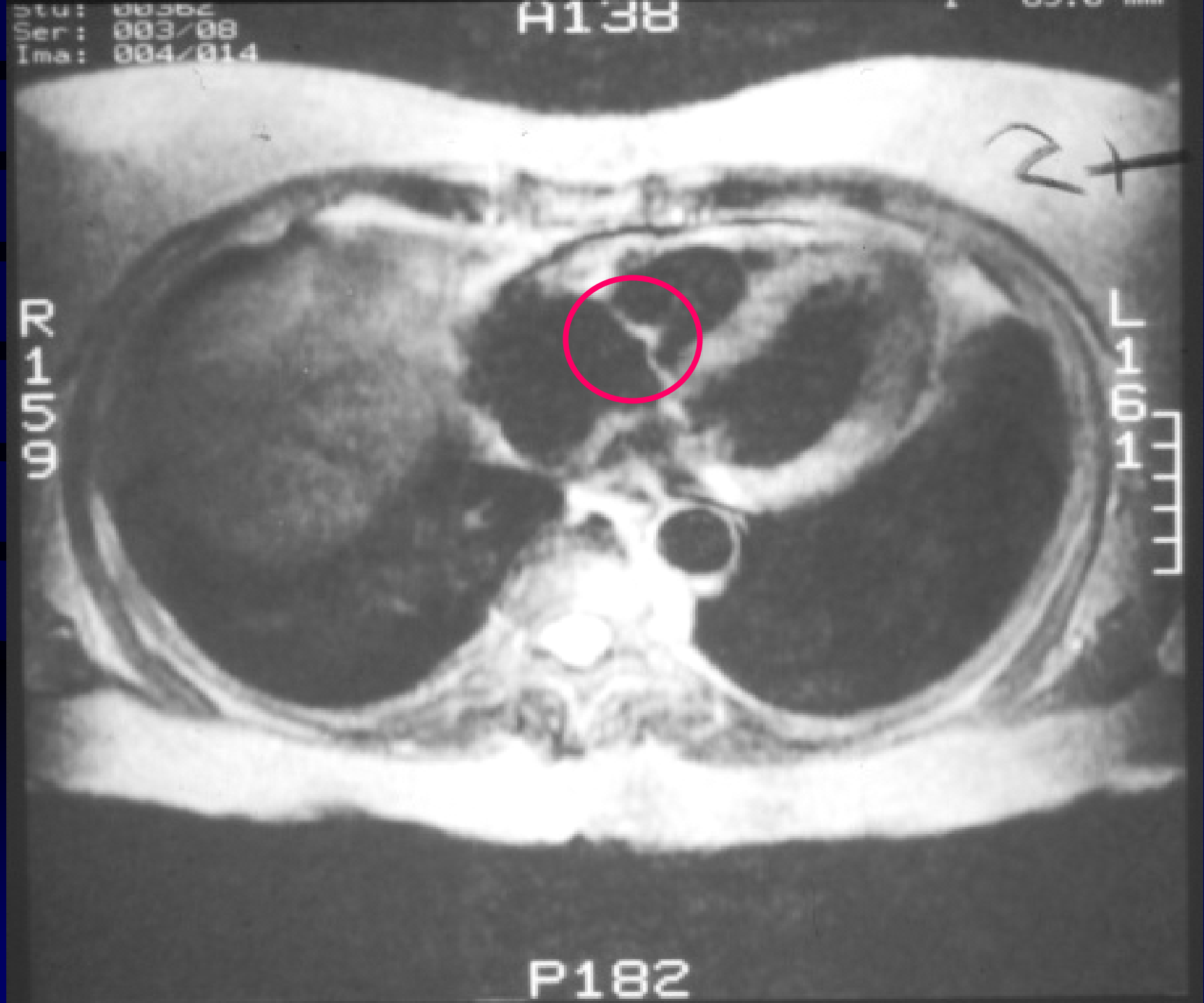

SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L


SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120
mA 280


Stu: 00362
Ser: 003/08
Ima: 004/014
A138
R159
L161
P182

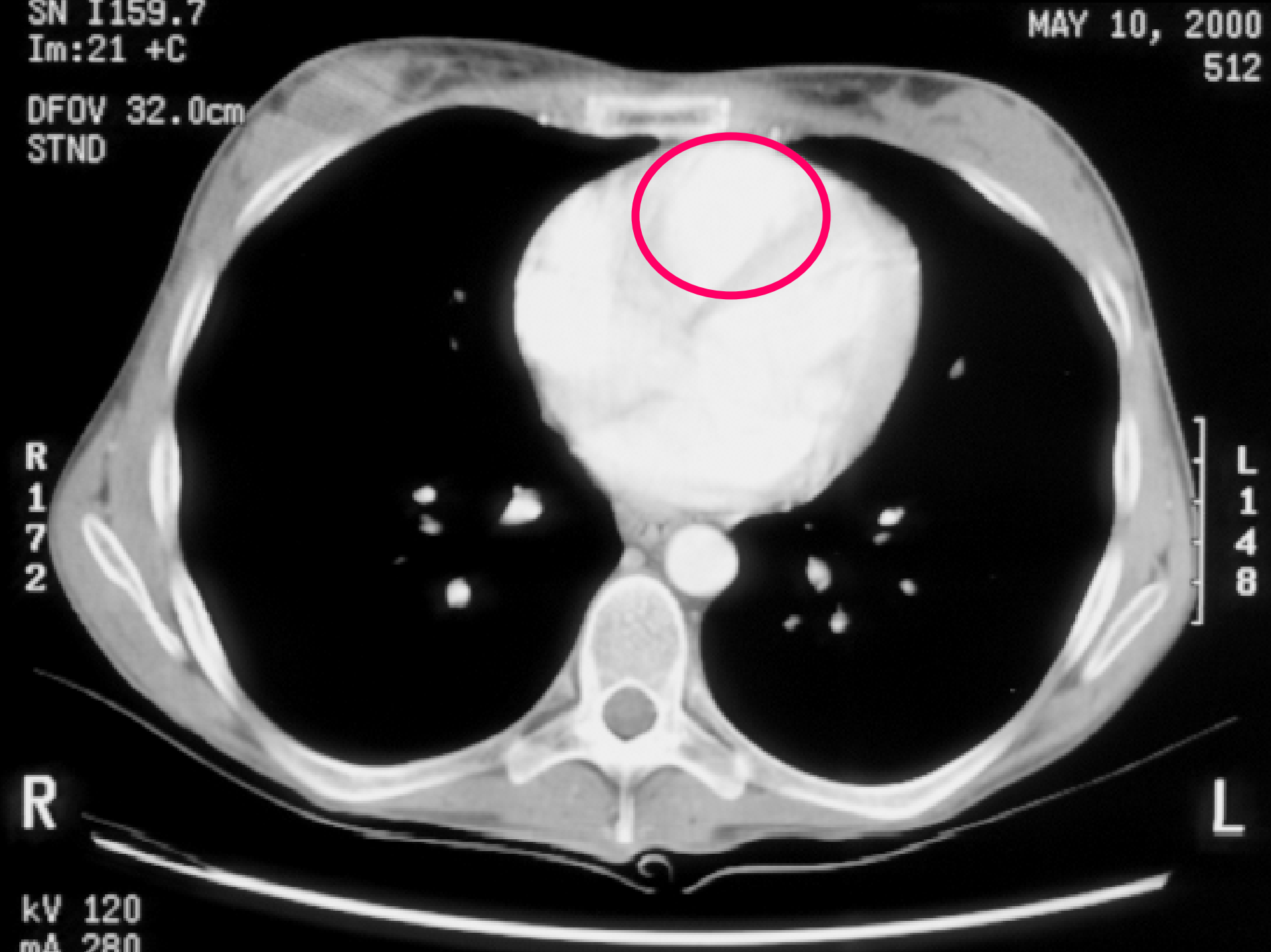
Valves

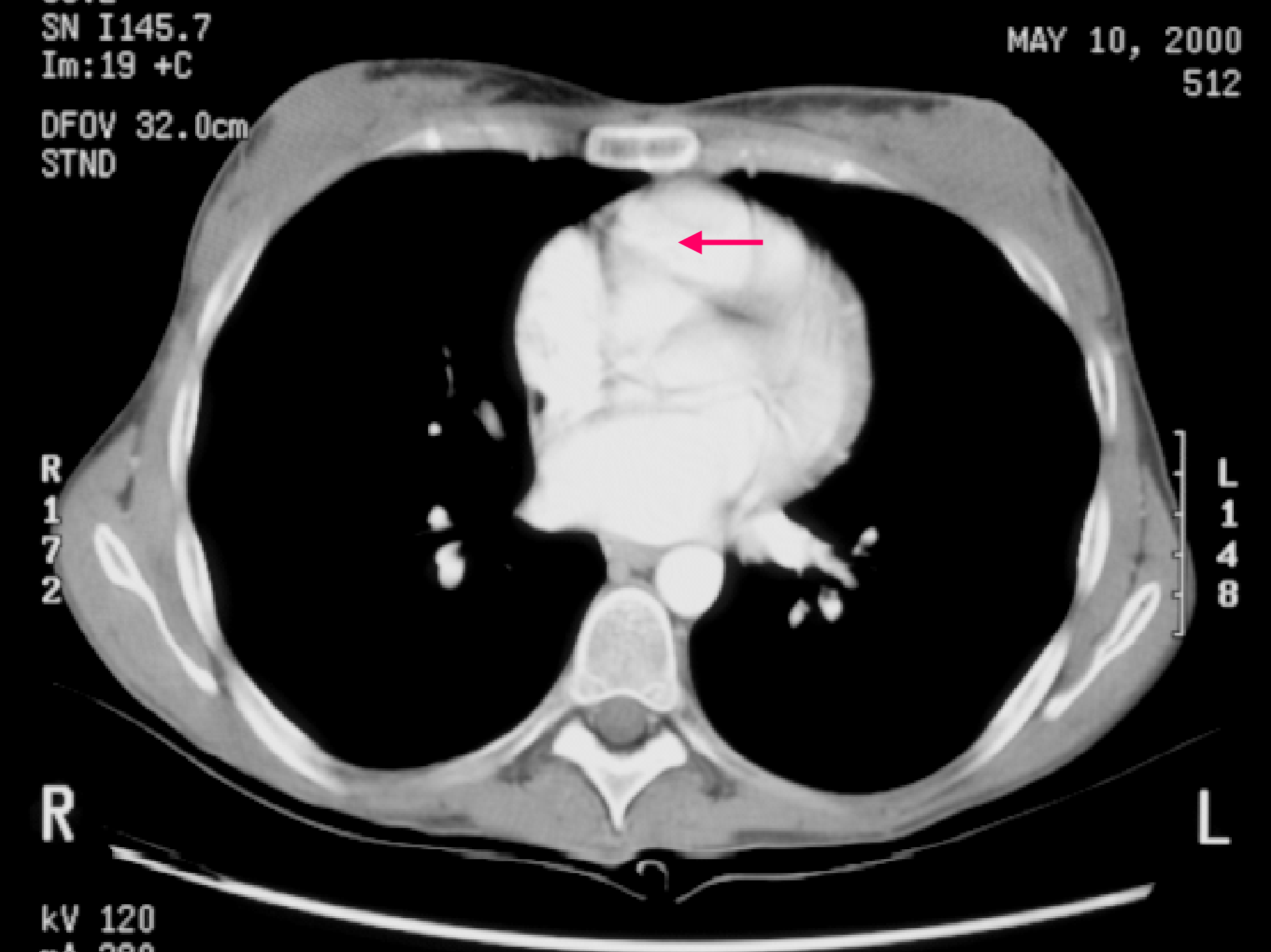
- Visible on MRI
  - no signal from moving blood
  - motion frozen


Ser: 003/08
Ima: 004/014
A138
R
159
L
161
P182

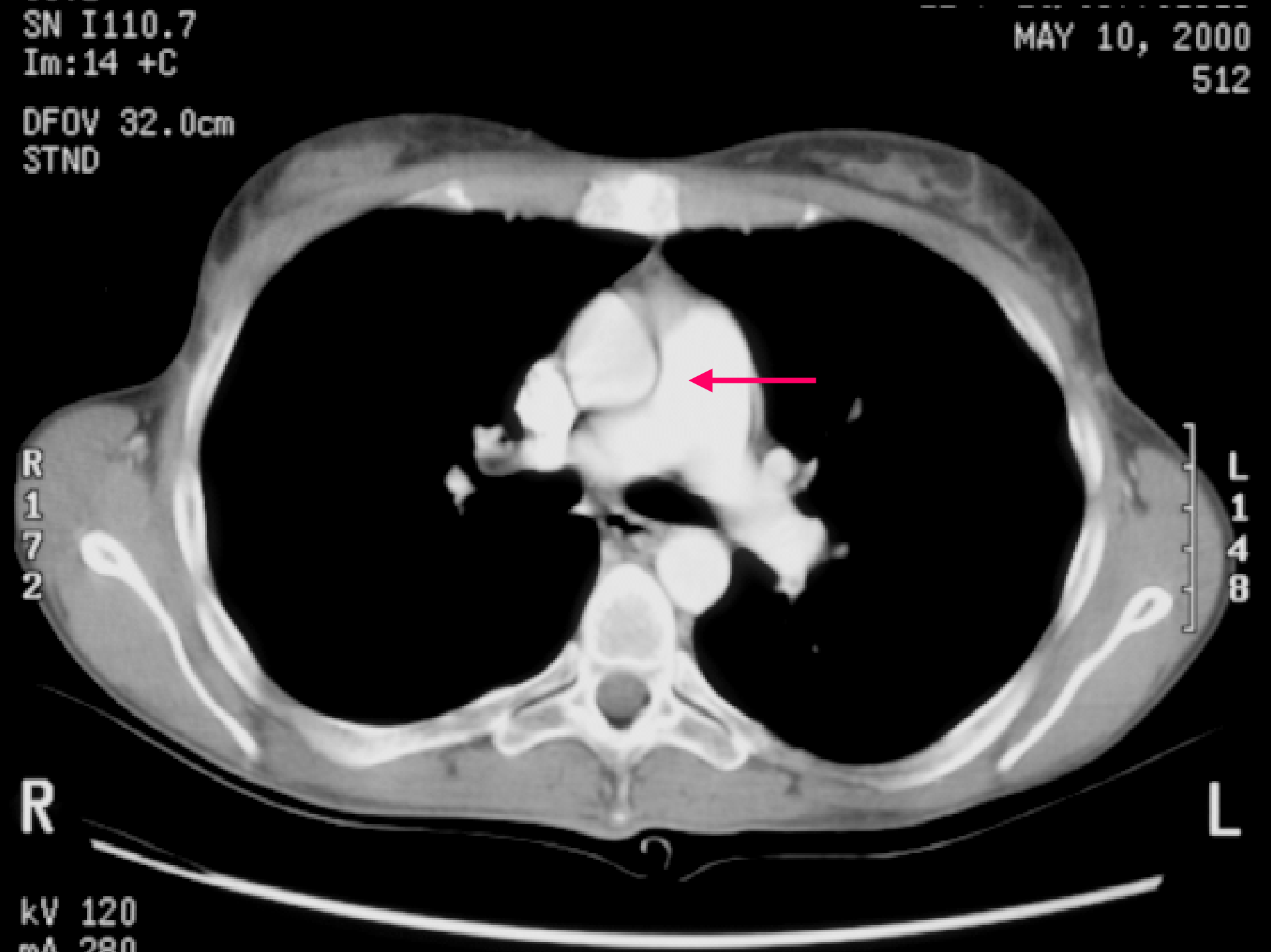
Right Ventricle

- Most anterior chamber
- Not bordered by lung in any direction
- Pulmonary trunk emerges from top and remains anterior


SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120
mA 280

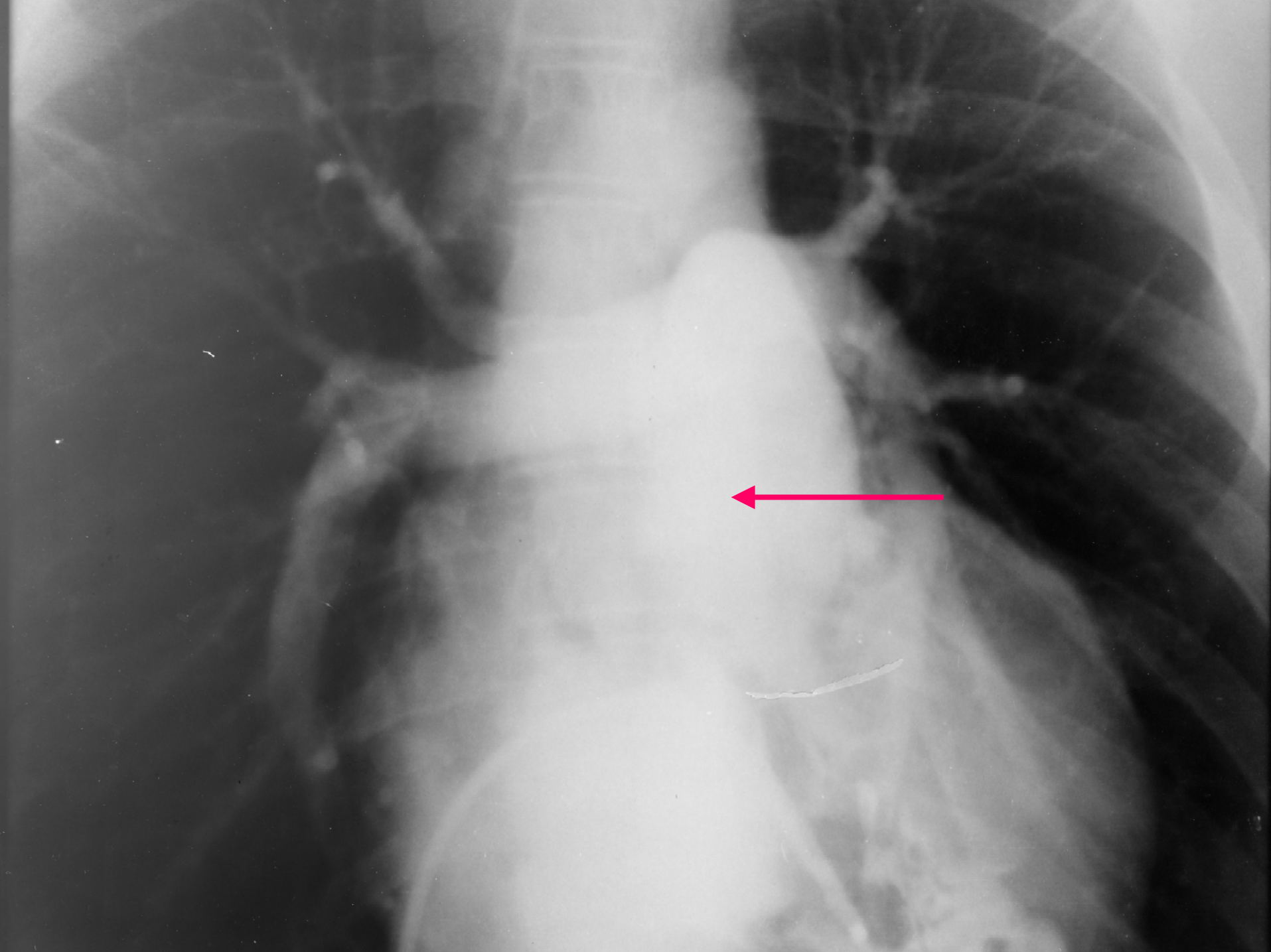

SN I145.7
Im:19 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120

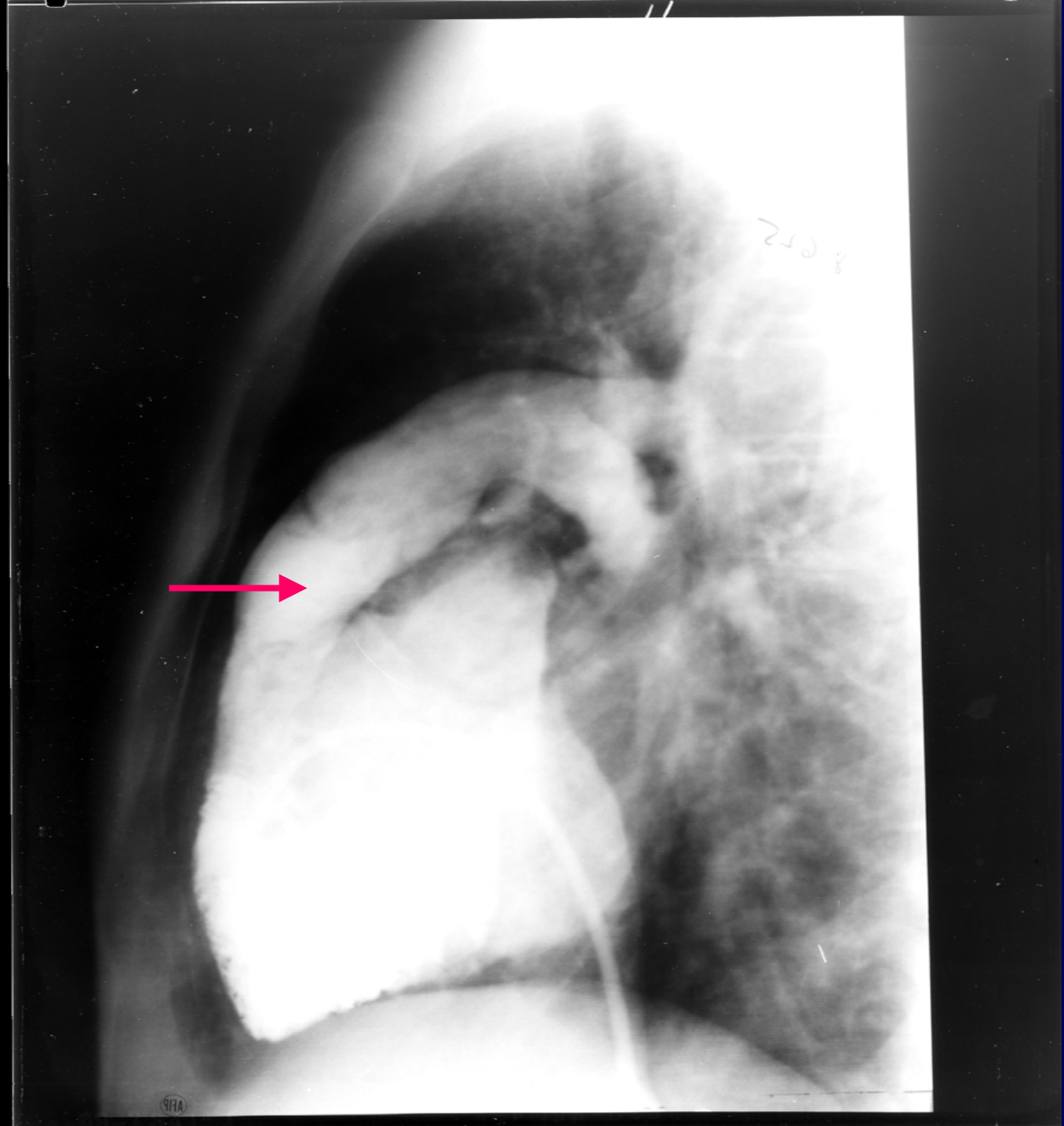

SN I124.7
Im:16 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120
mA 280

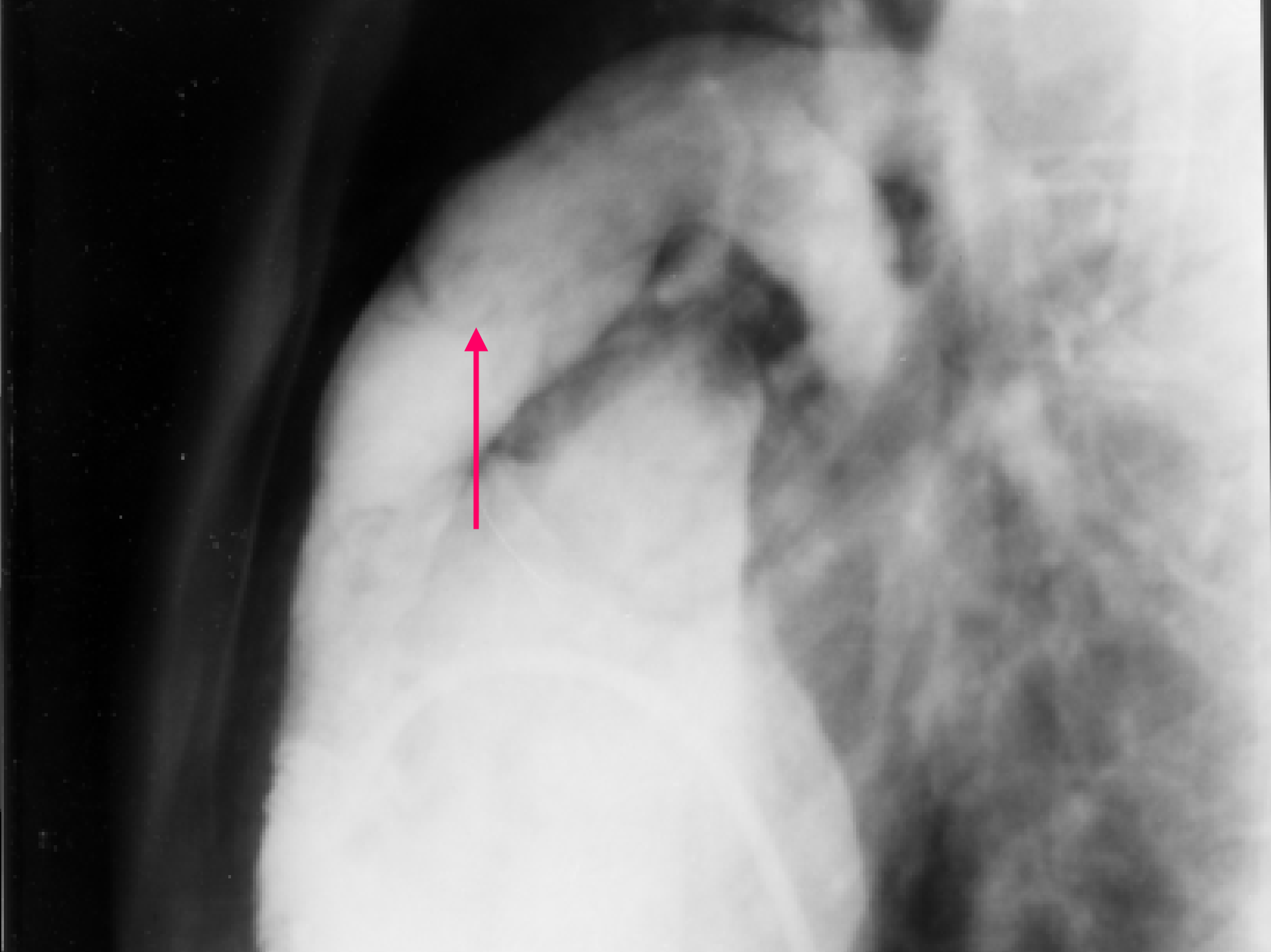

SN I110.7
Im:14 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120

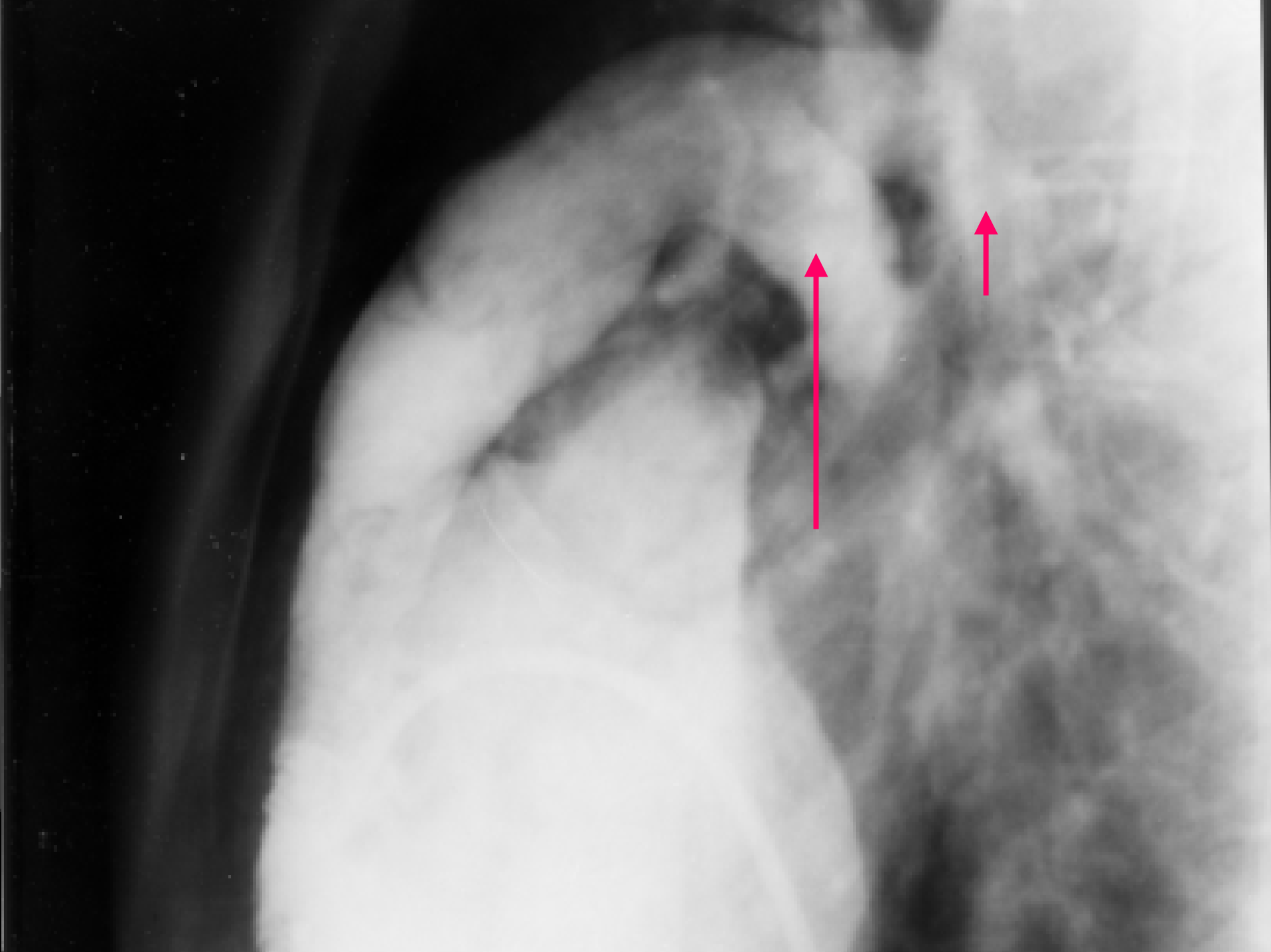
Pulmonary Arteries

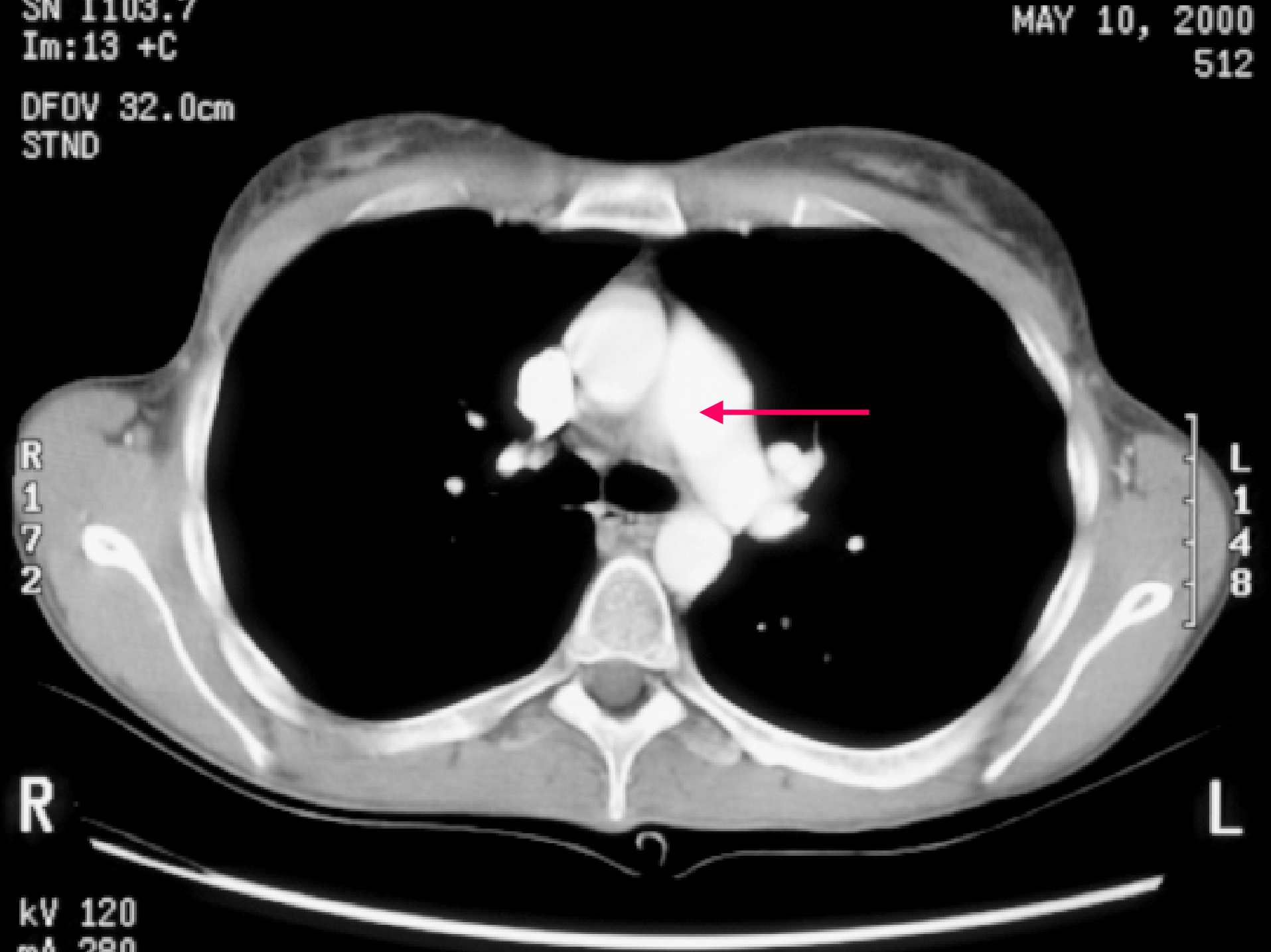
- Main
  - origin ANTERIOR from RV
  - passes under aortic arch
- Left
  - passes OVER left main bronchus
  - highest branch of system
- Right
  - straight lateral from origin

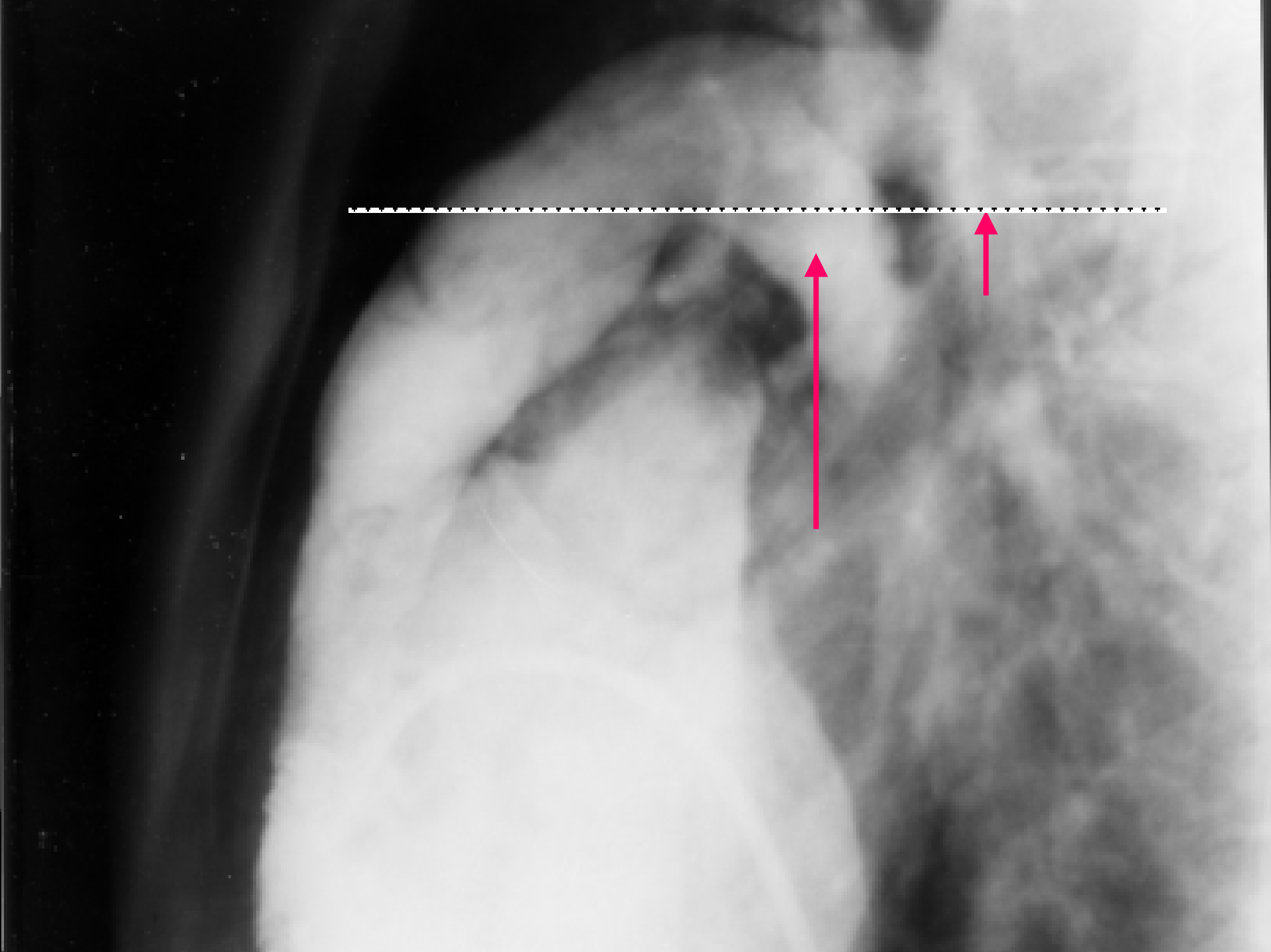


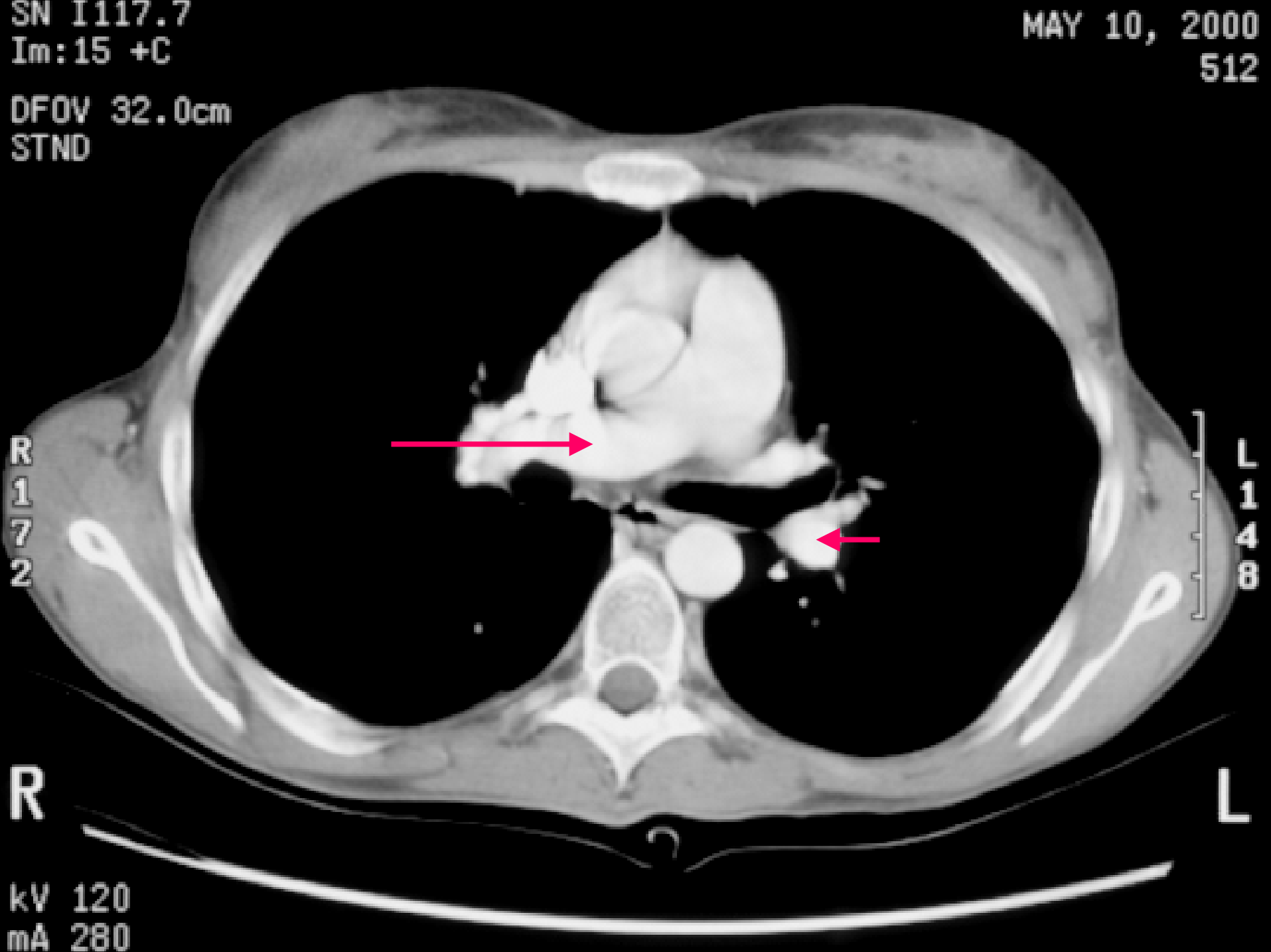


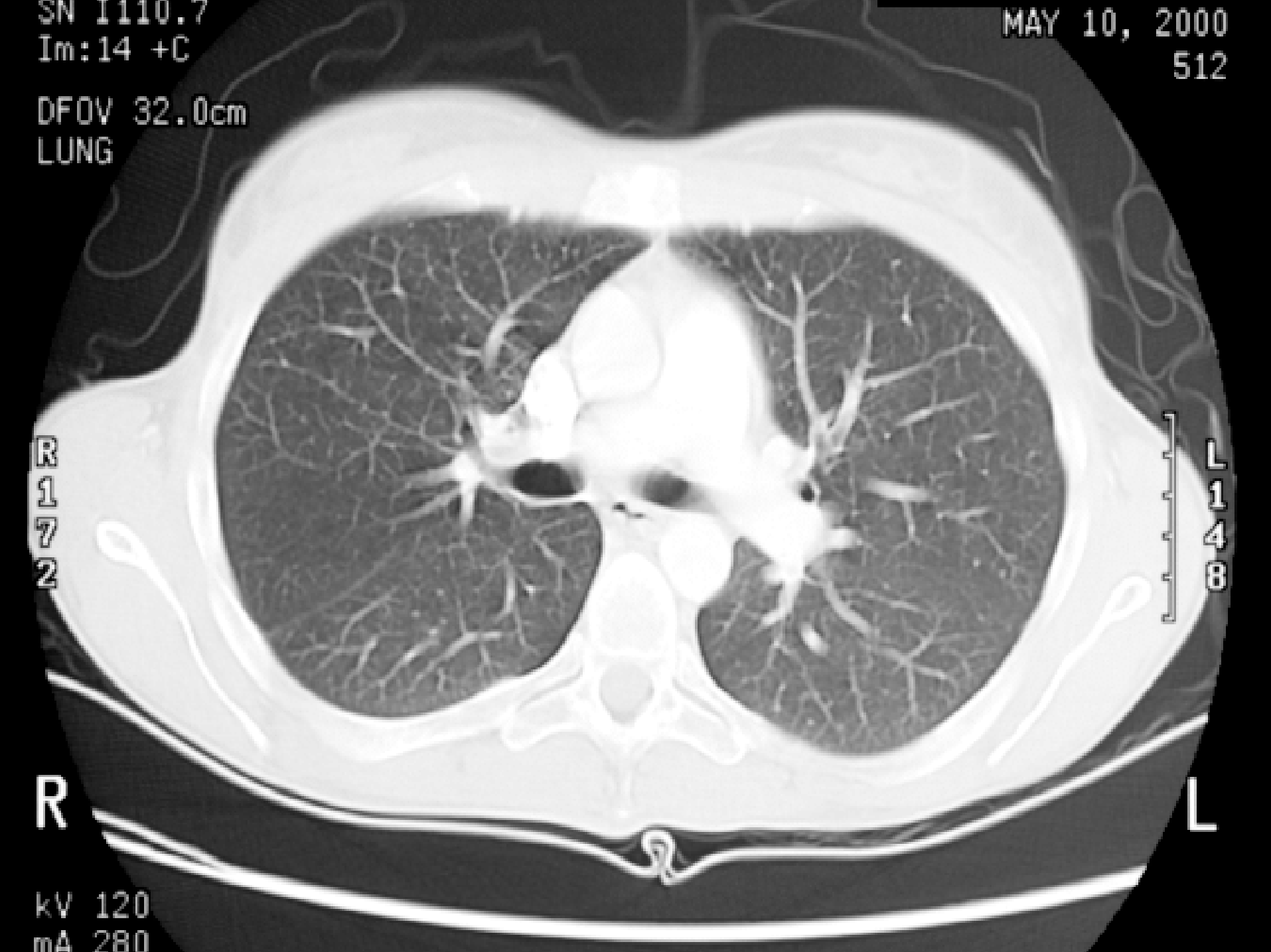





SN 1103.7
Im:13 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120



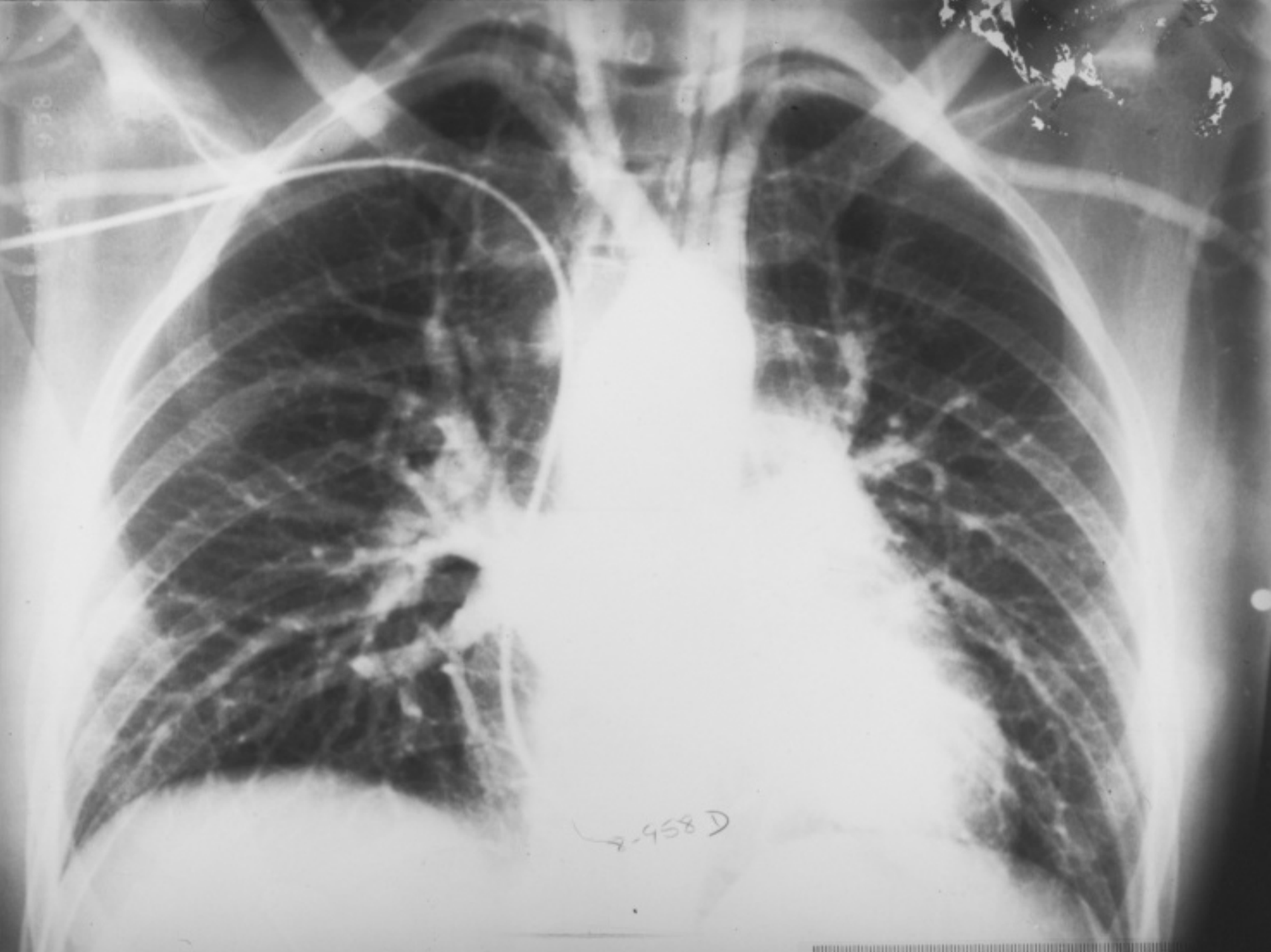

SN I117.7
Im:15 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120
mA 280

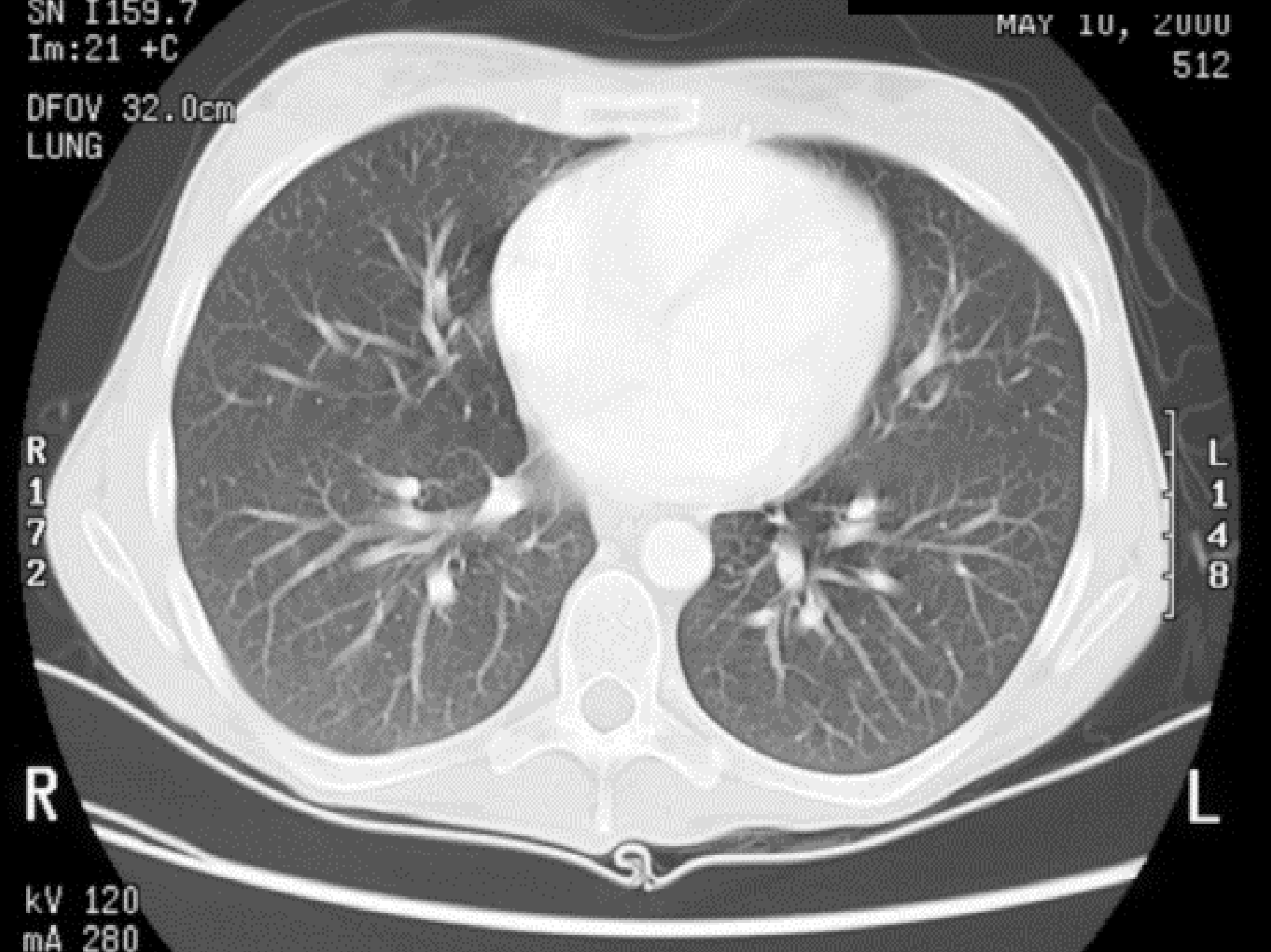

SN I110.7
Im:14 +C
DFOV 32.0cm
LUNG
MAY 10, 2000
512
R 172
L 148
R
L
kV 120
mA 280

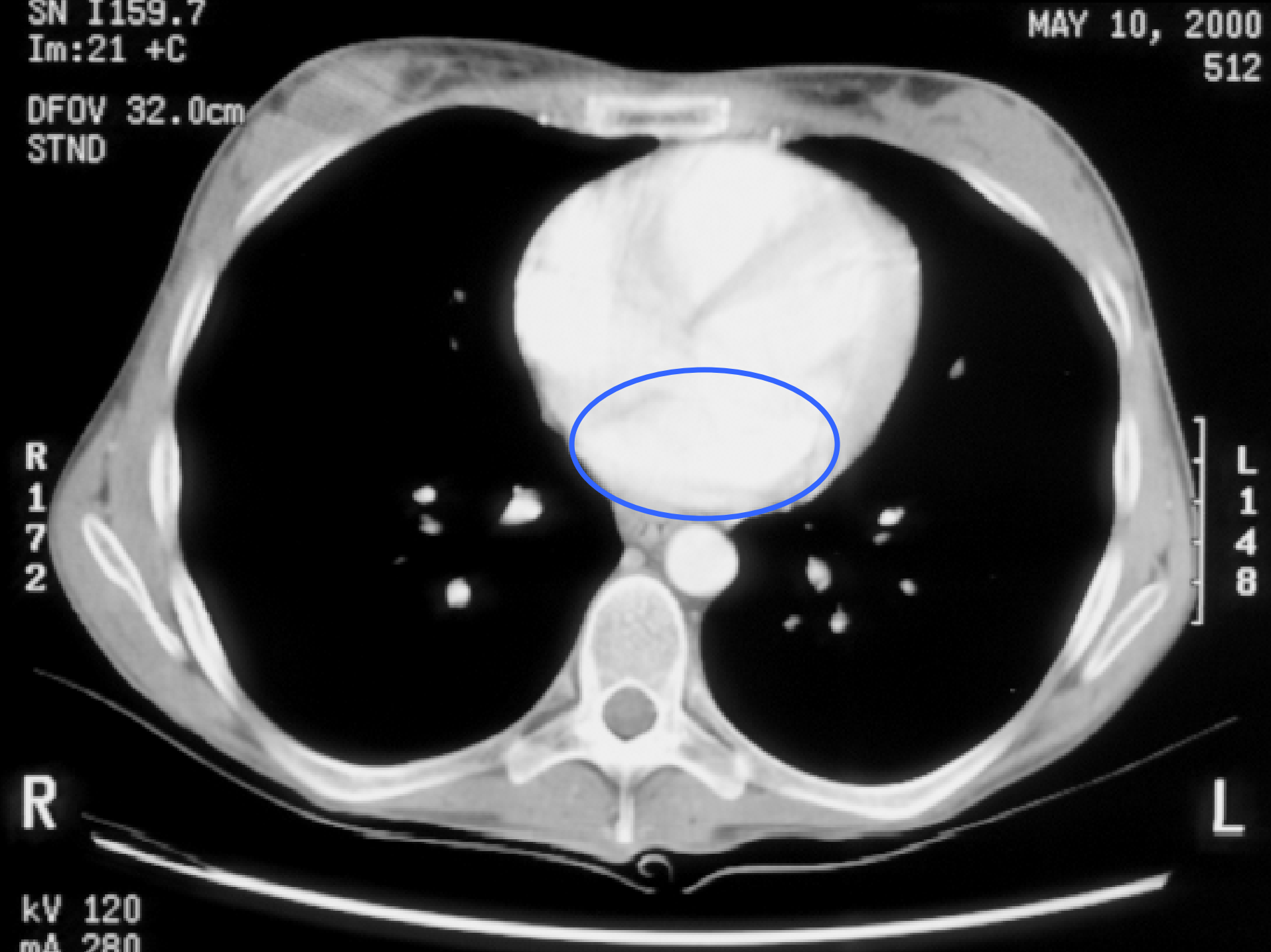

B-958 D

Pulmonary Veins

- Confluence inferior and posterior to origin of arteries
- Empty into left atrium

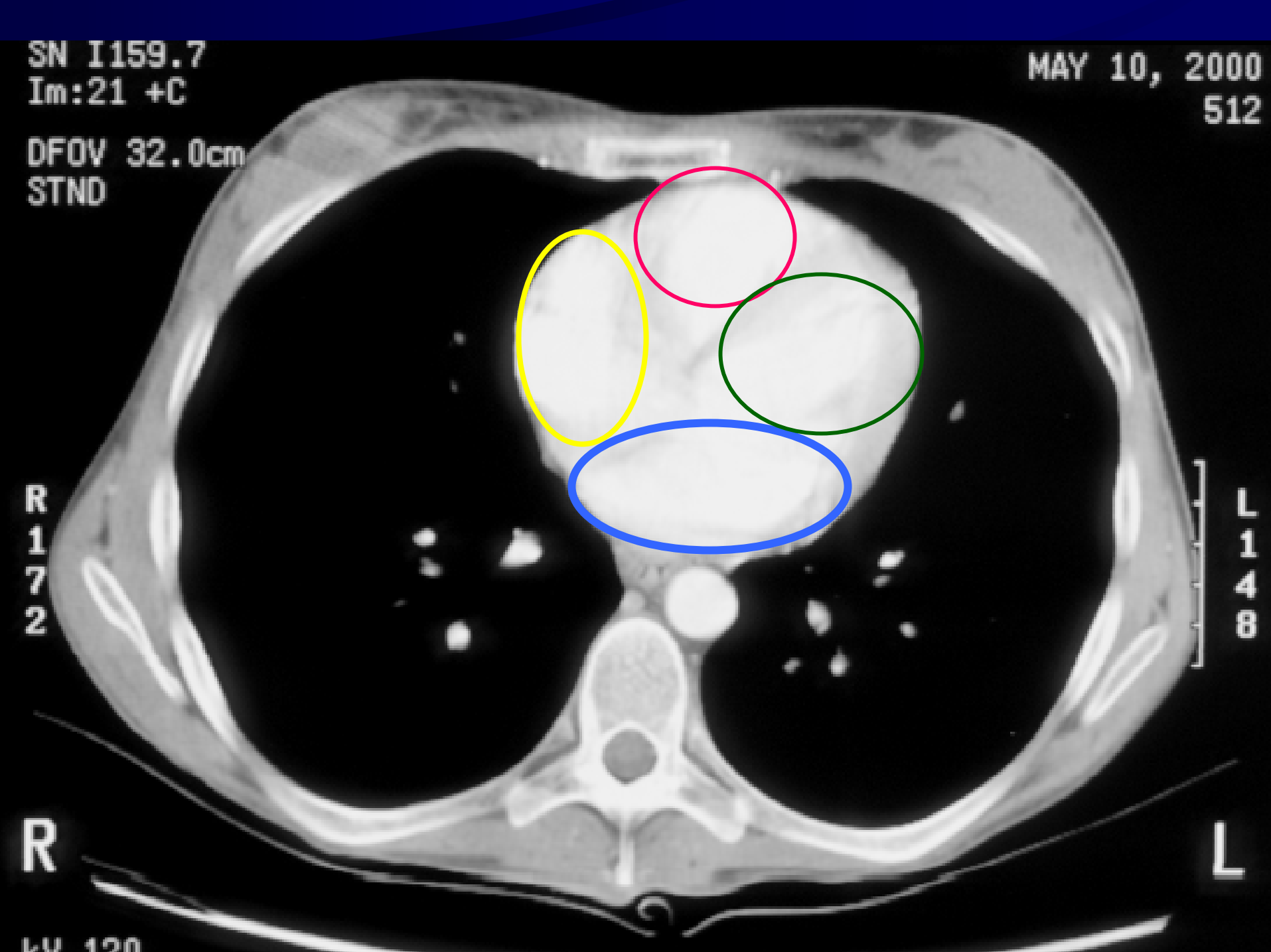

958
L-958 D

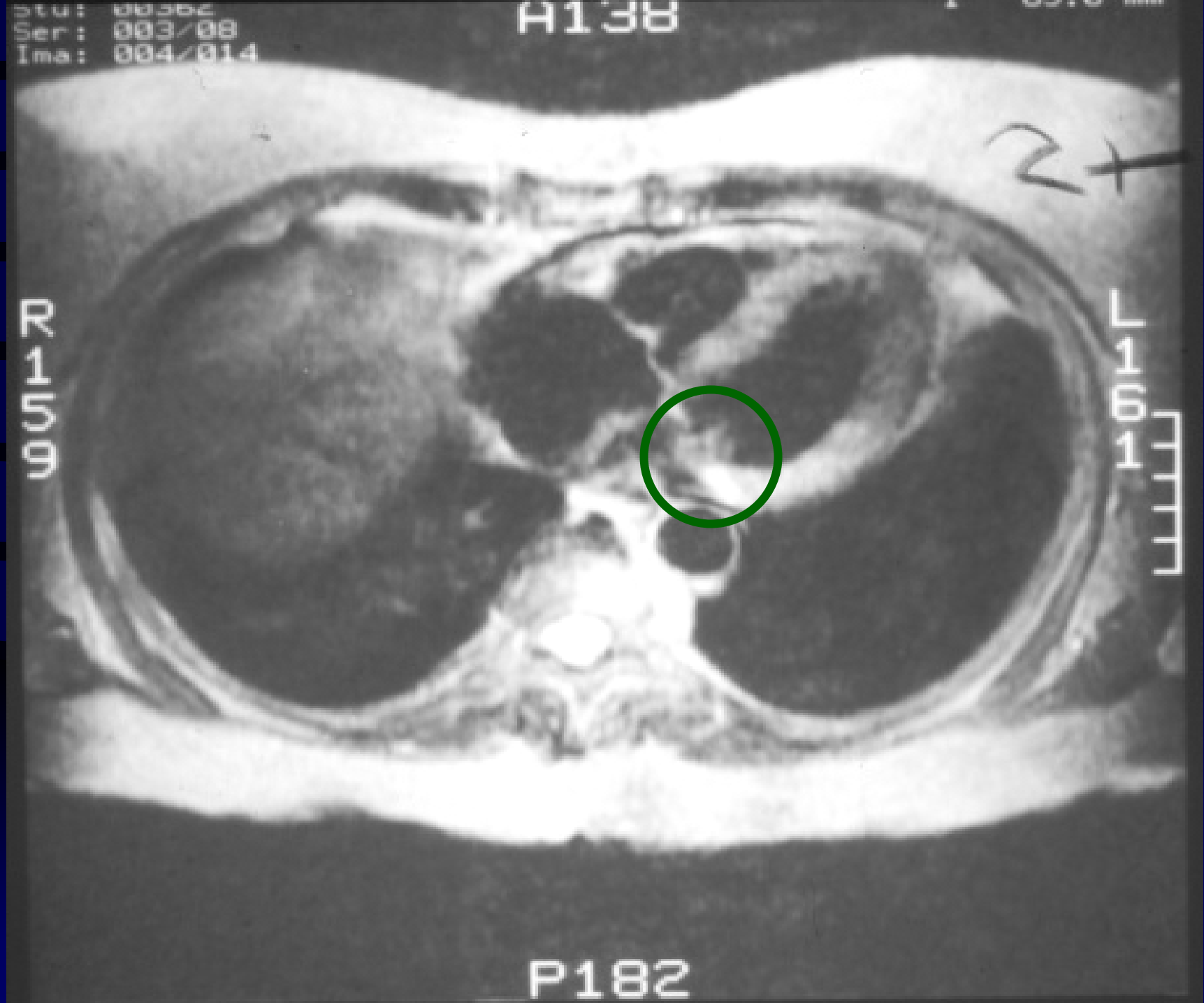

SN I159.7
Im:21 +C
MAY 10, 2000
512
DFOV 32.0cm
LUNG
R
172
L
148
R
L
kV 120
mA 280

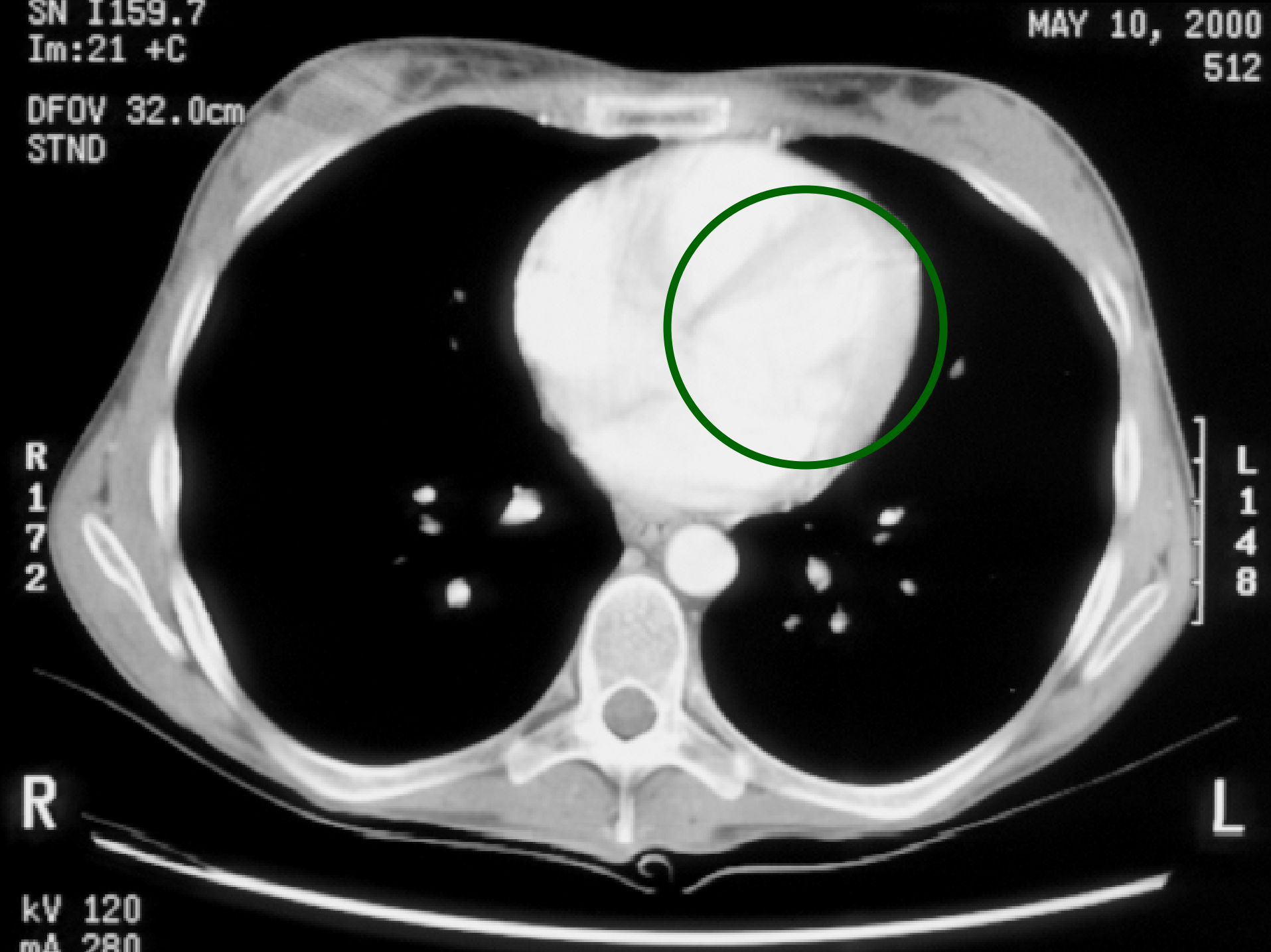

SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120
mA 280

Left Atrium

- Most posterior chamber
- Pulmonary veins enter both sides and top
- Minimal contact with lungs, so not clearly bordered on plain films

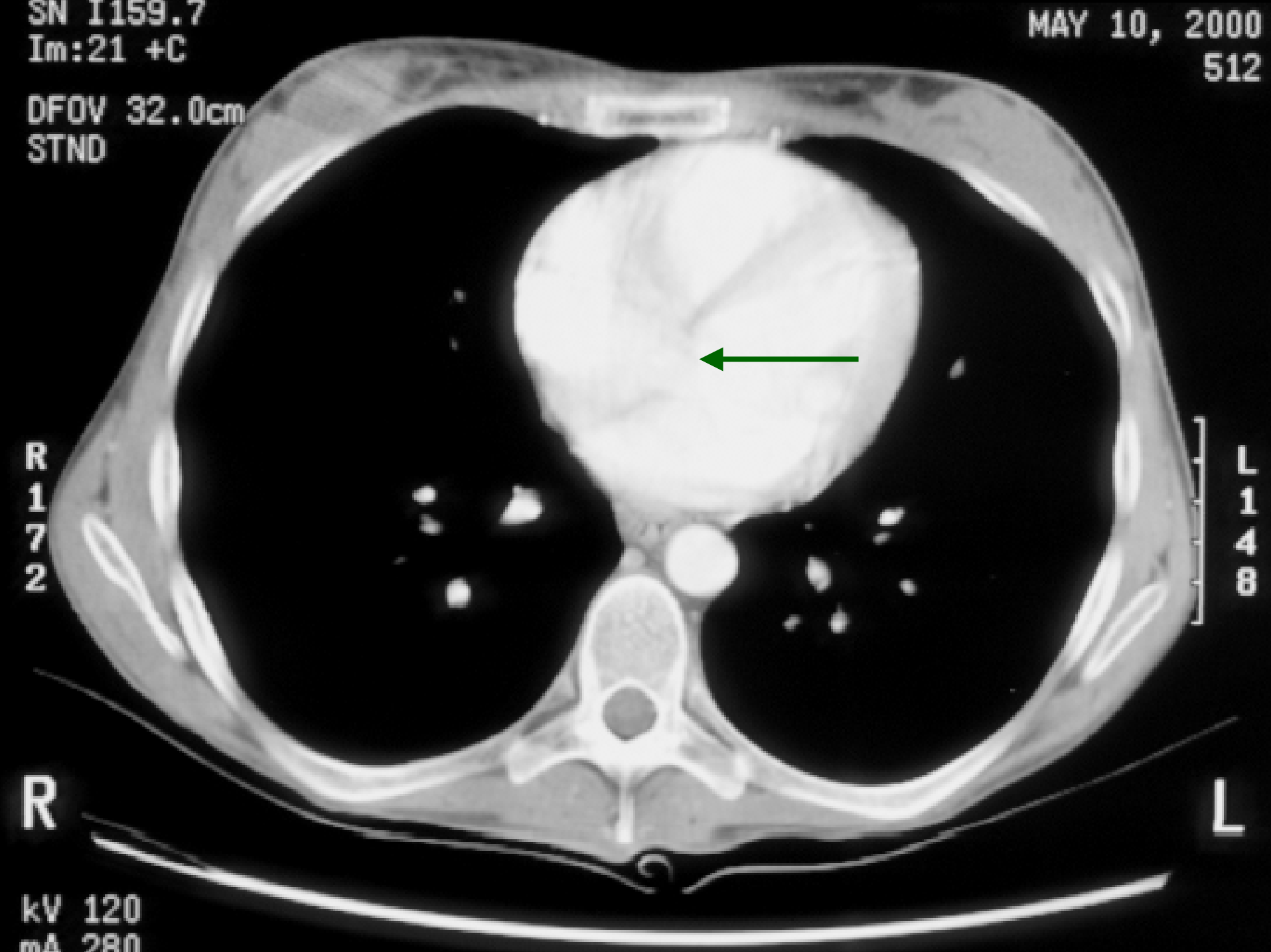

SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L

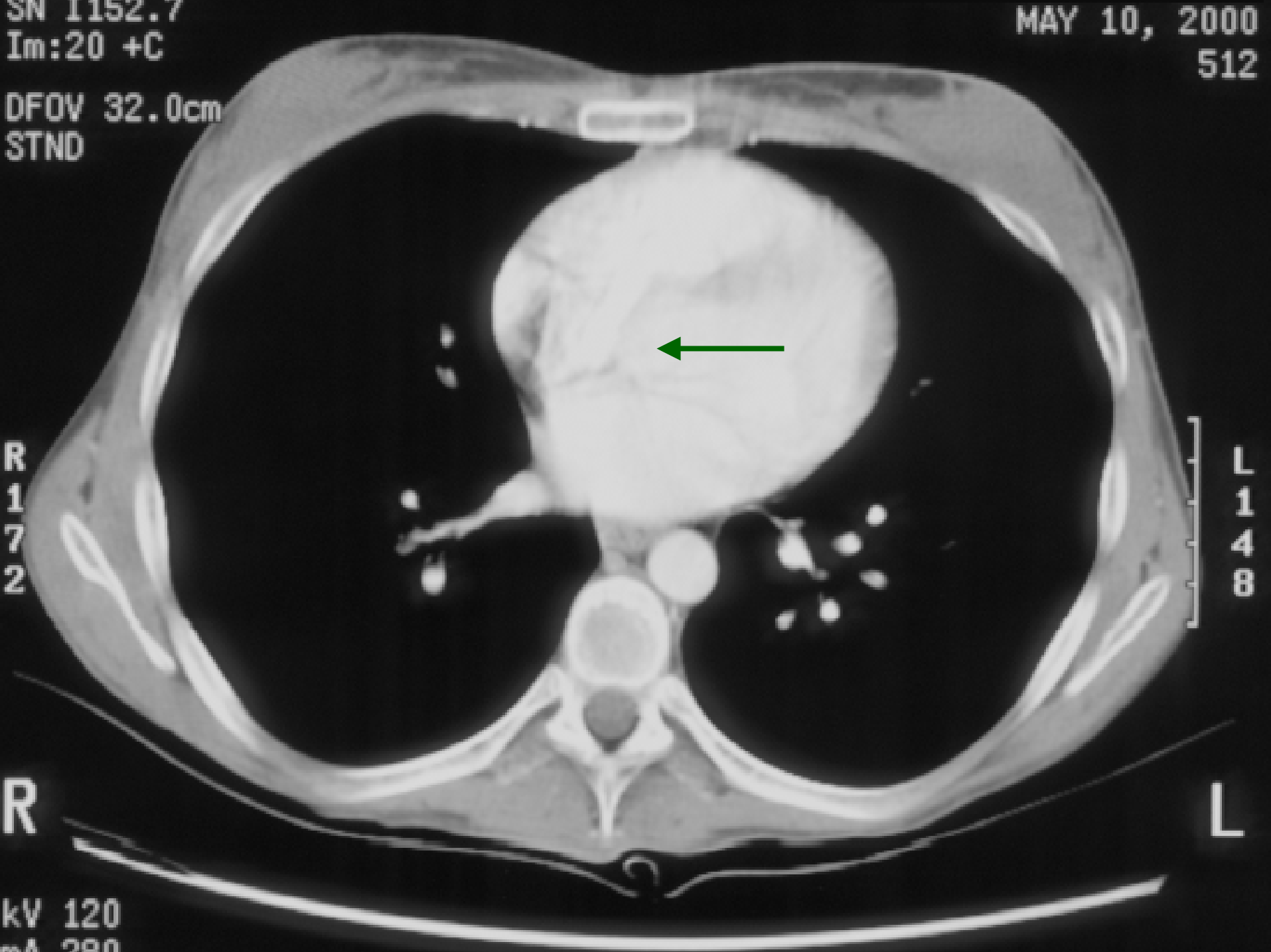

Stu: 00362
Ser: 003/08
Ima: 004/014
A138
R
159
L
161
P182

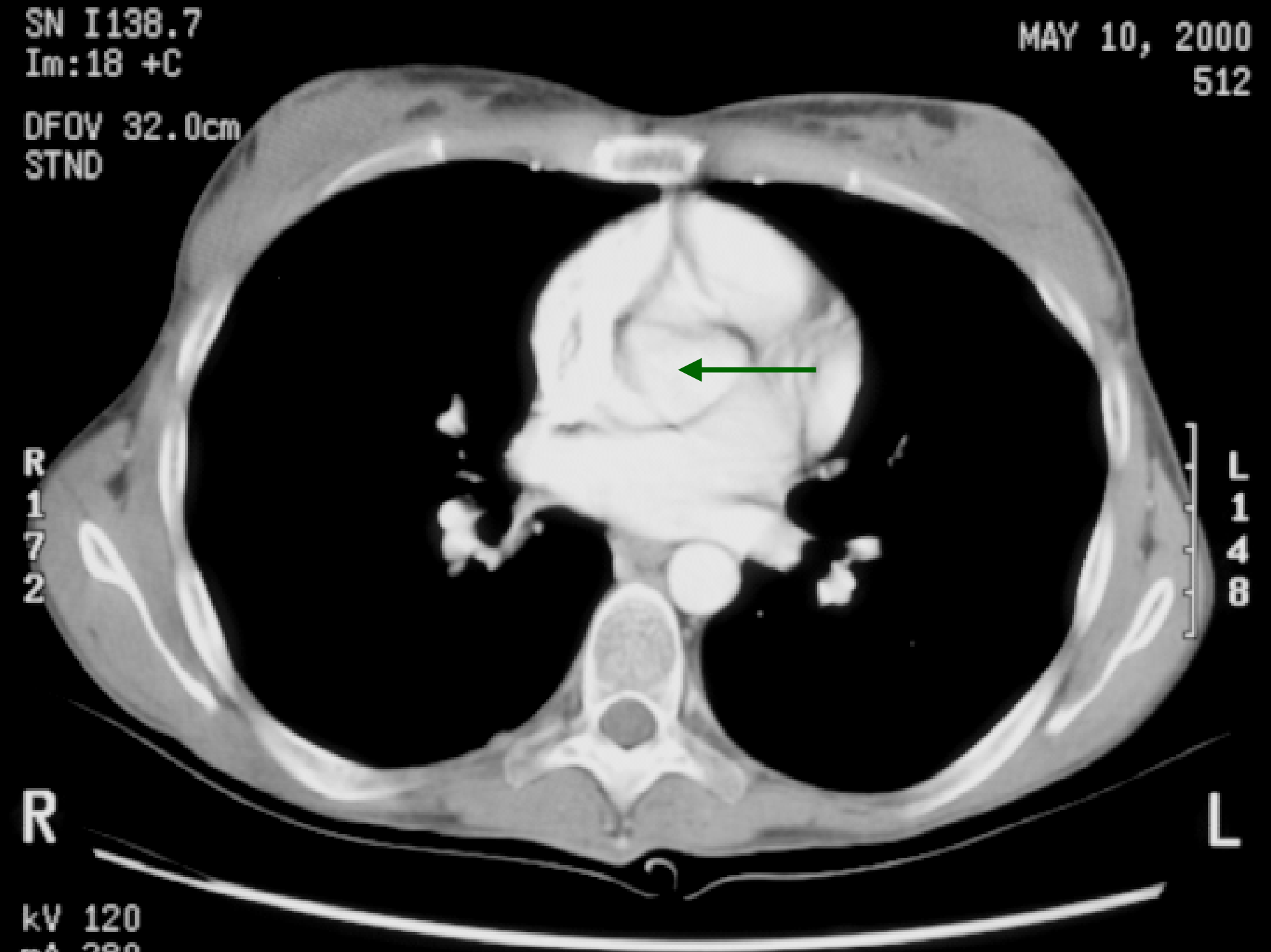

SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120
mA 280

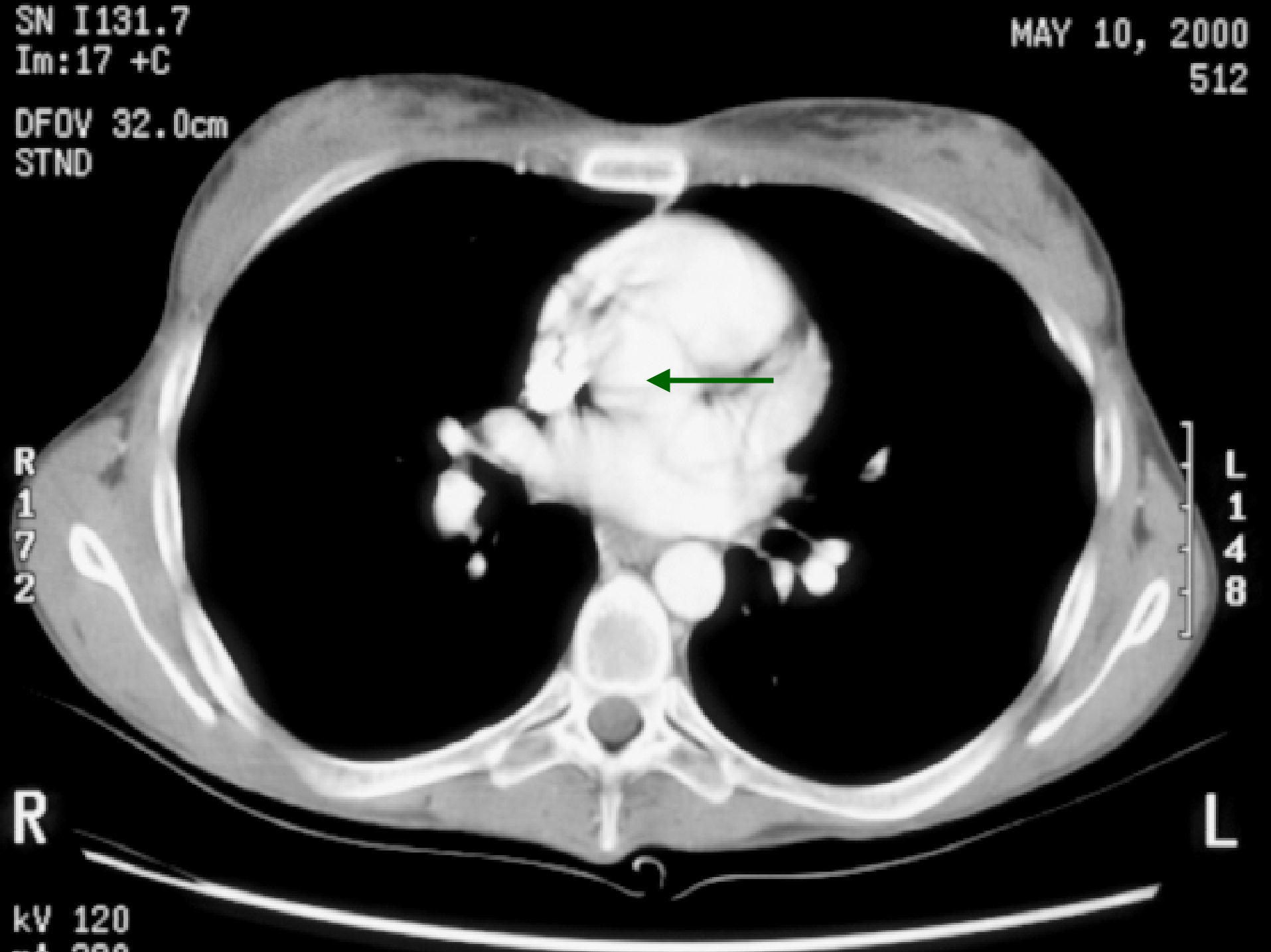
Left Ventricle

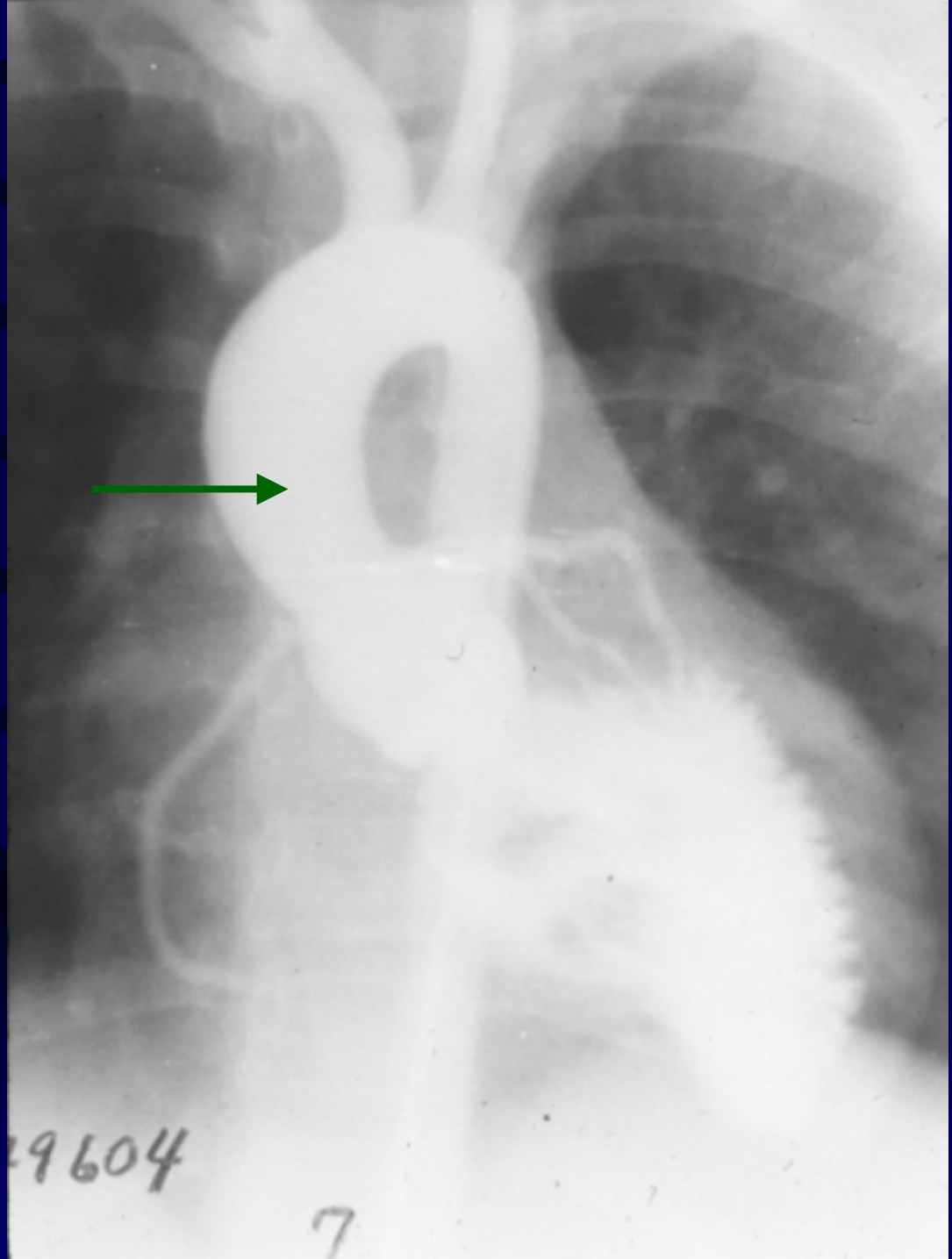
- Entire left heart border
- Aorta emerges from right upper border

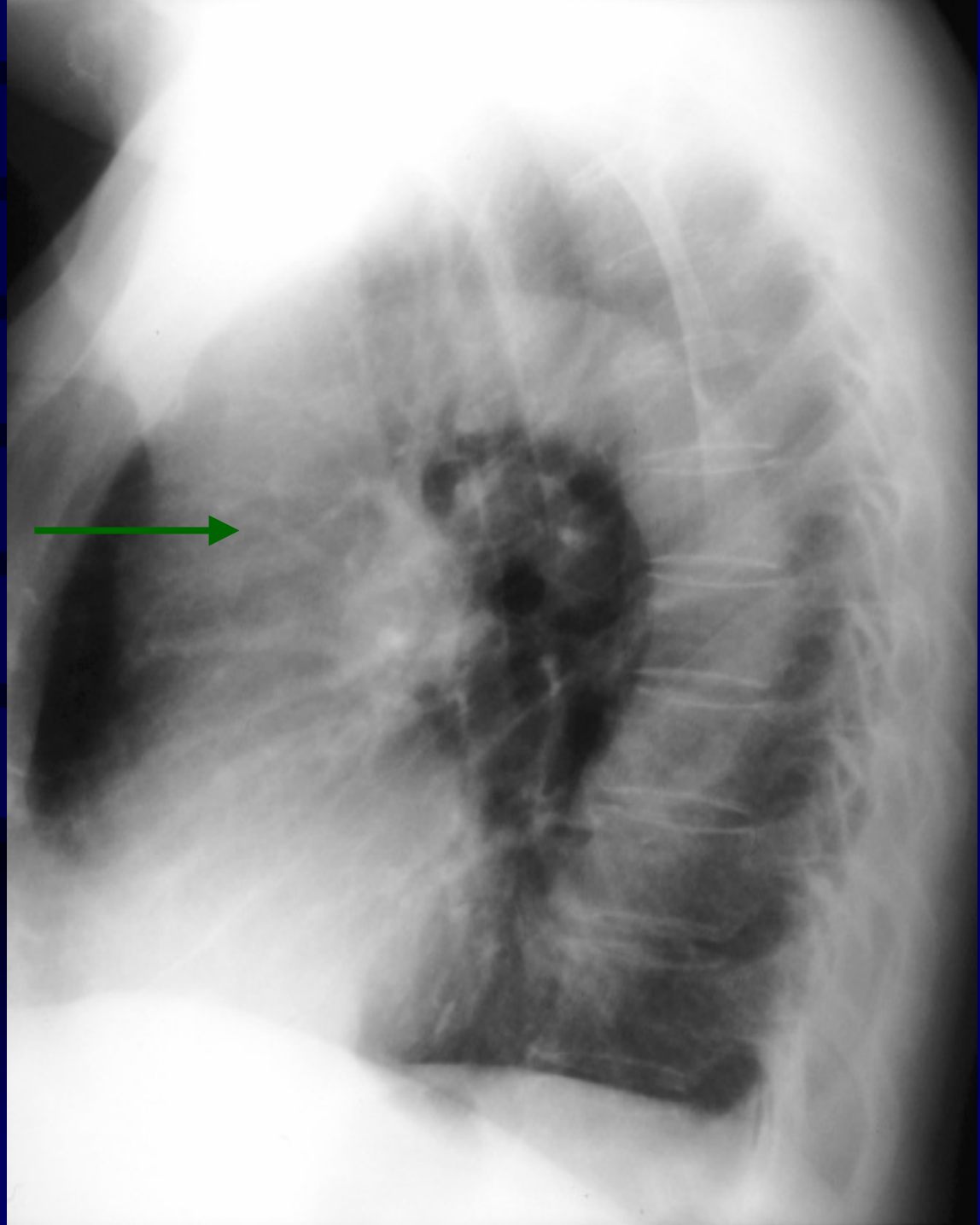

SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120
mA 280

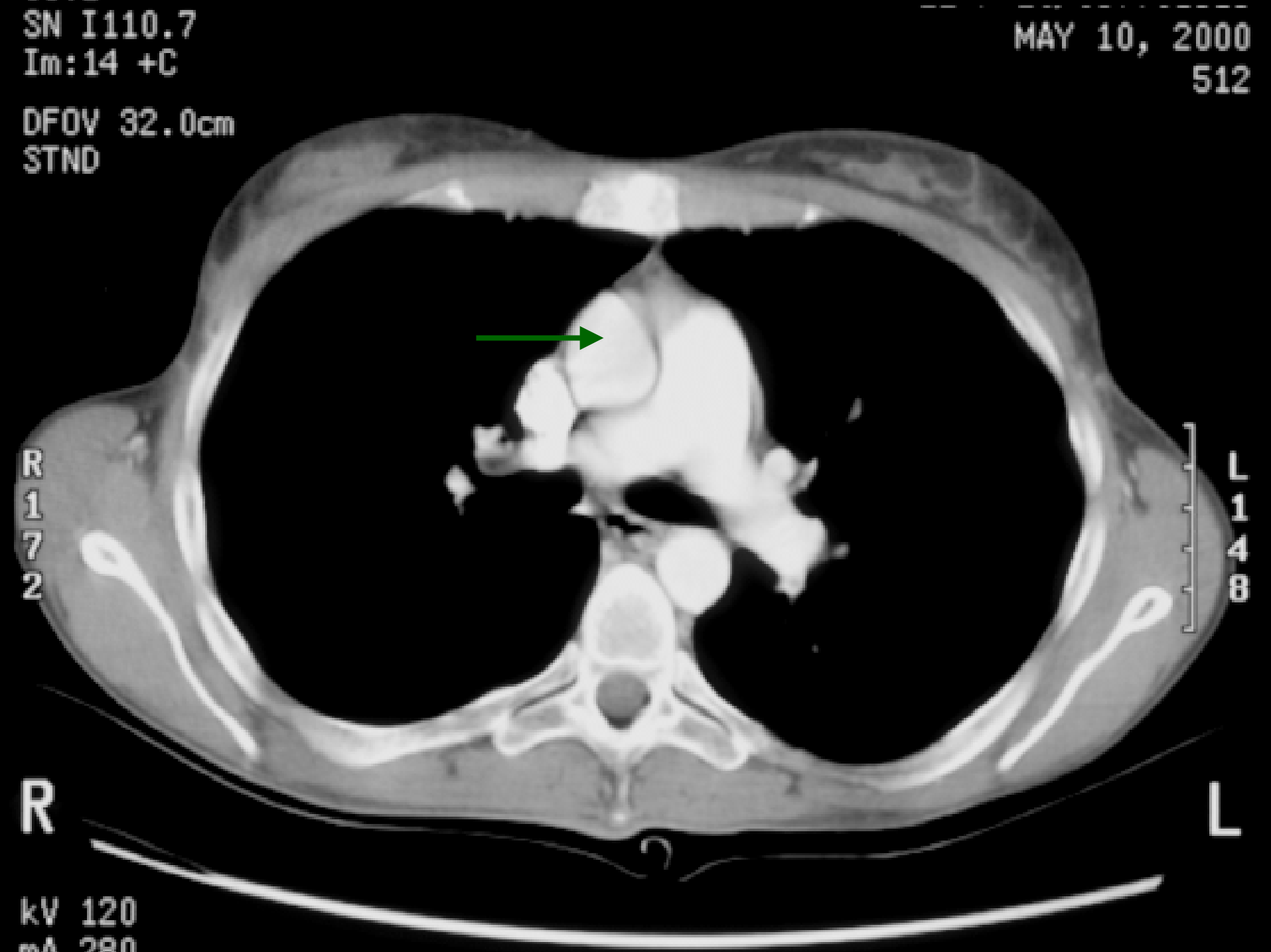

SN I152.7
Im:20 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120

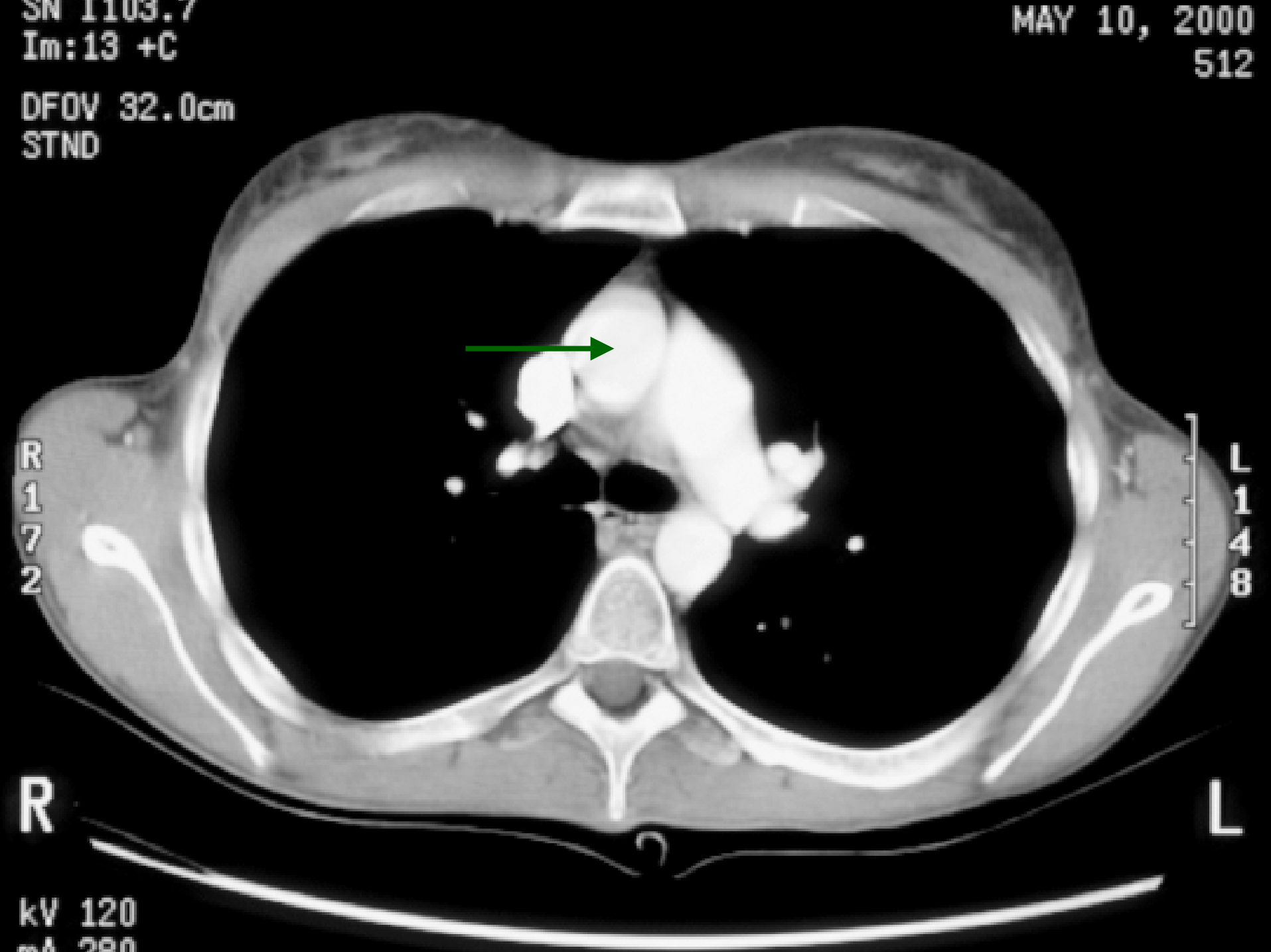

SN I138.7
Im:18 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120

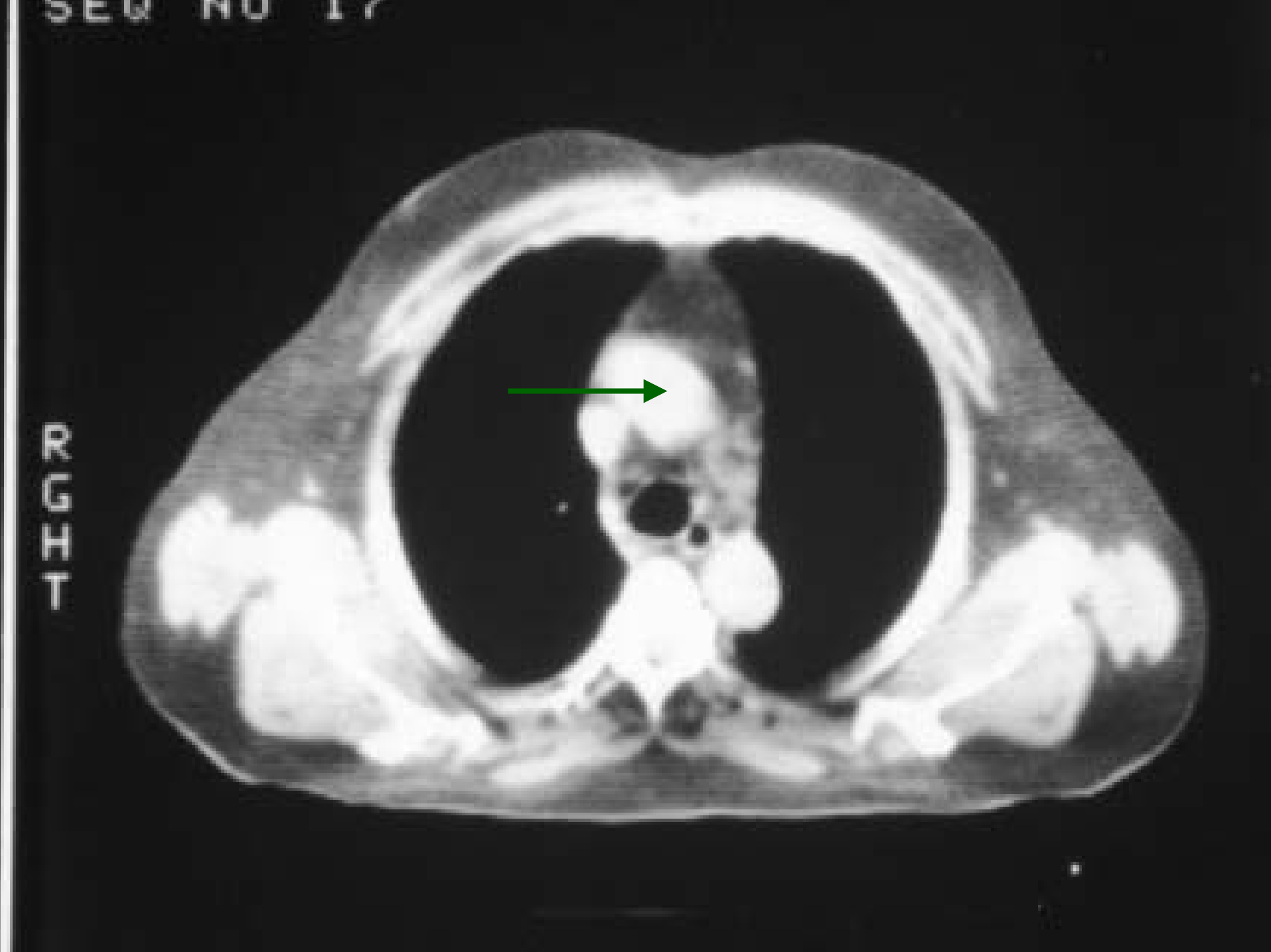

SN I131.7
Im:17 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120

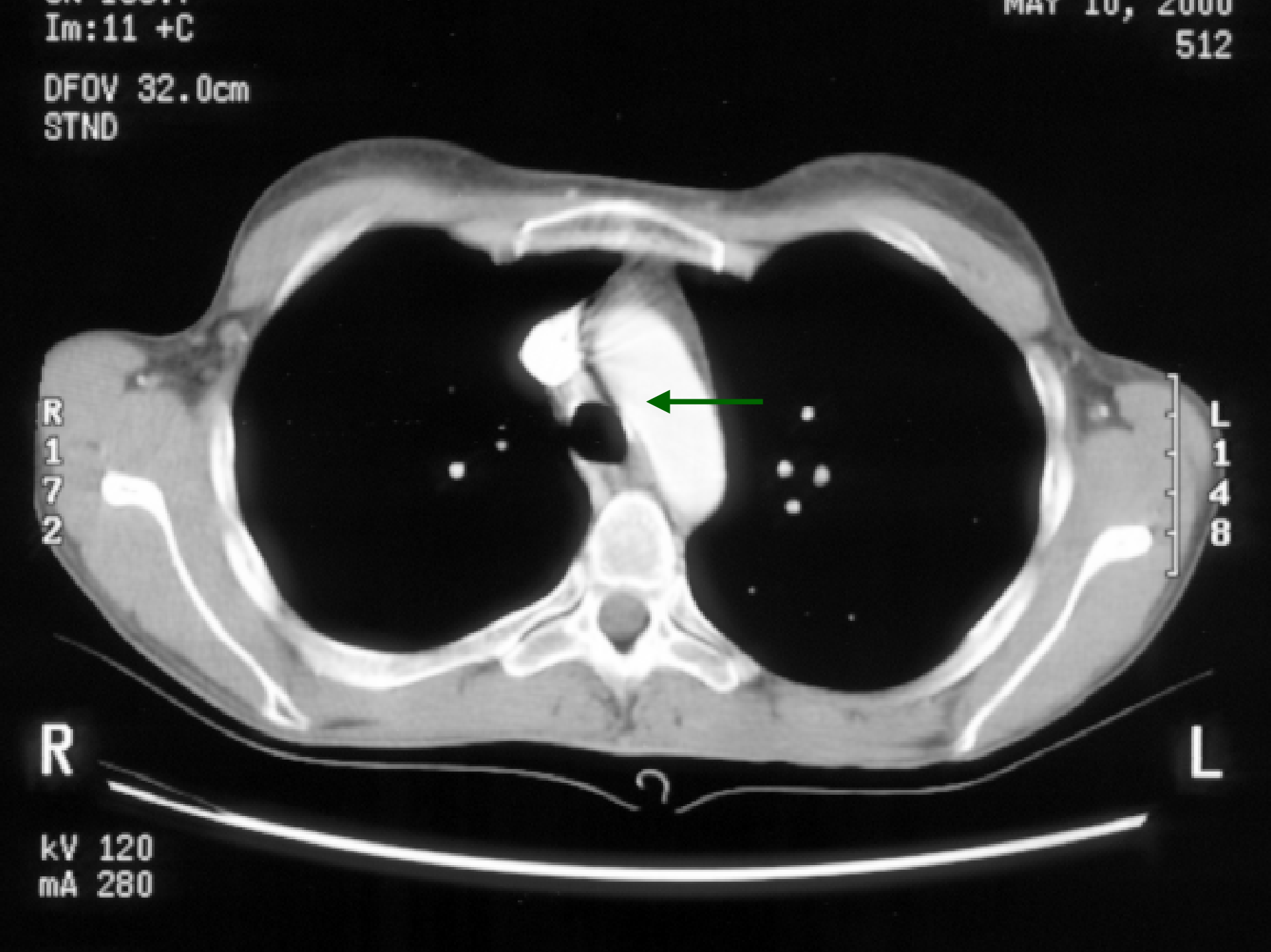

9604
7




SN I110.7
Im:14 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120


SN 1103.7
Im:13 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120


SEQ NO 17
RGHT

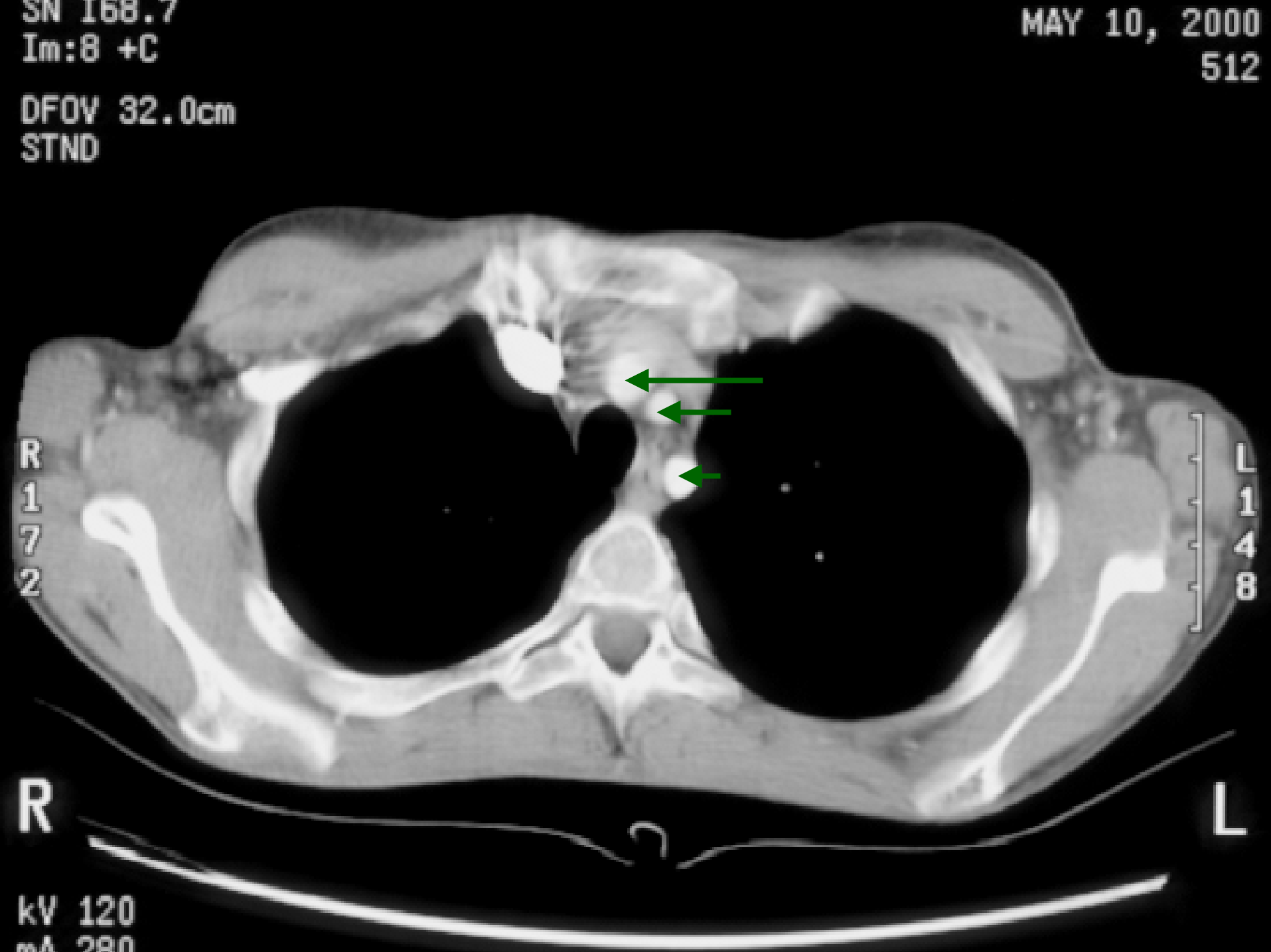

Im:11 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120
mA 280

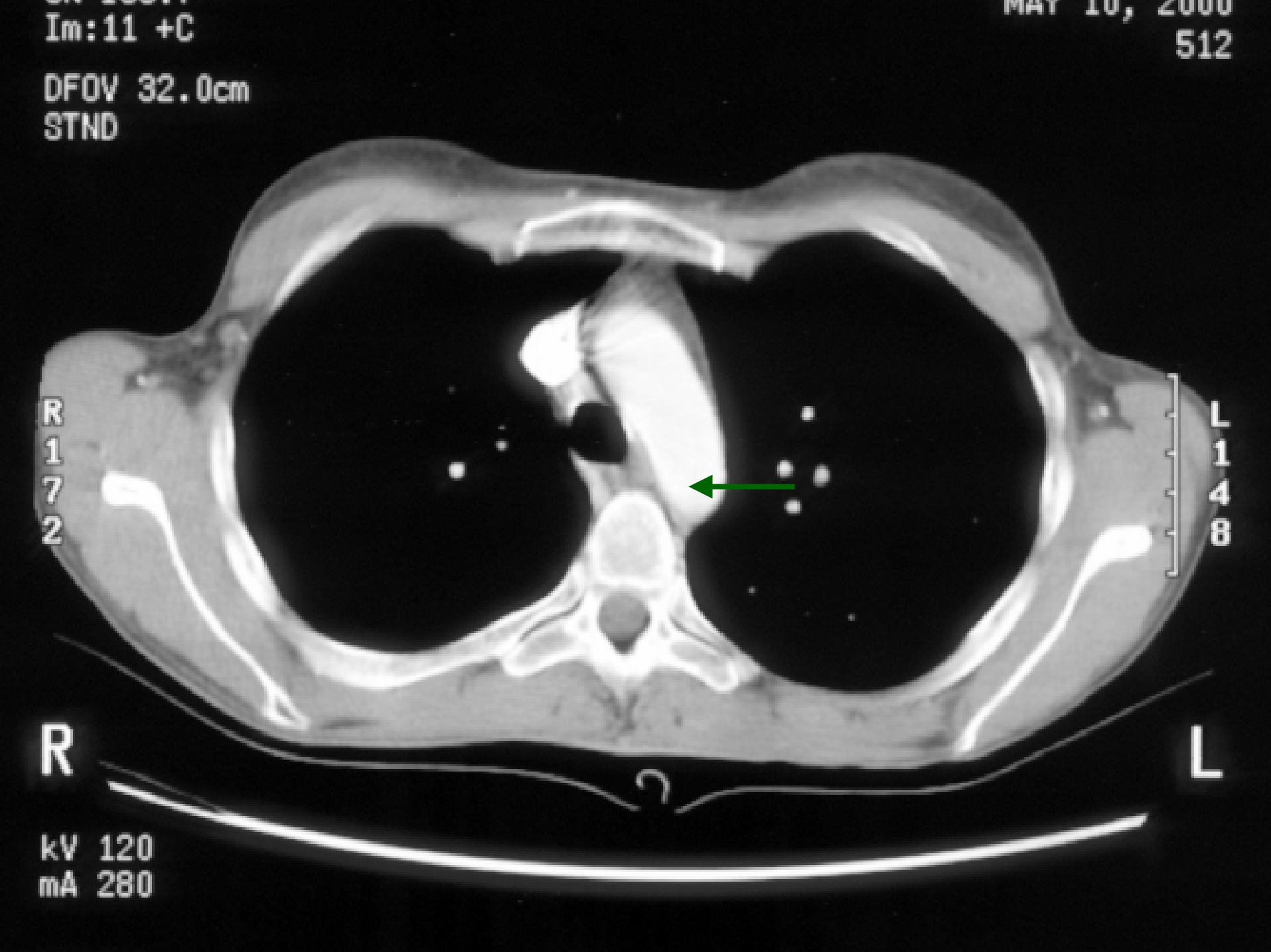

SN I68.7
Im:8 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120

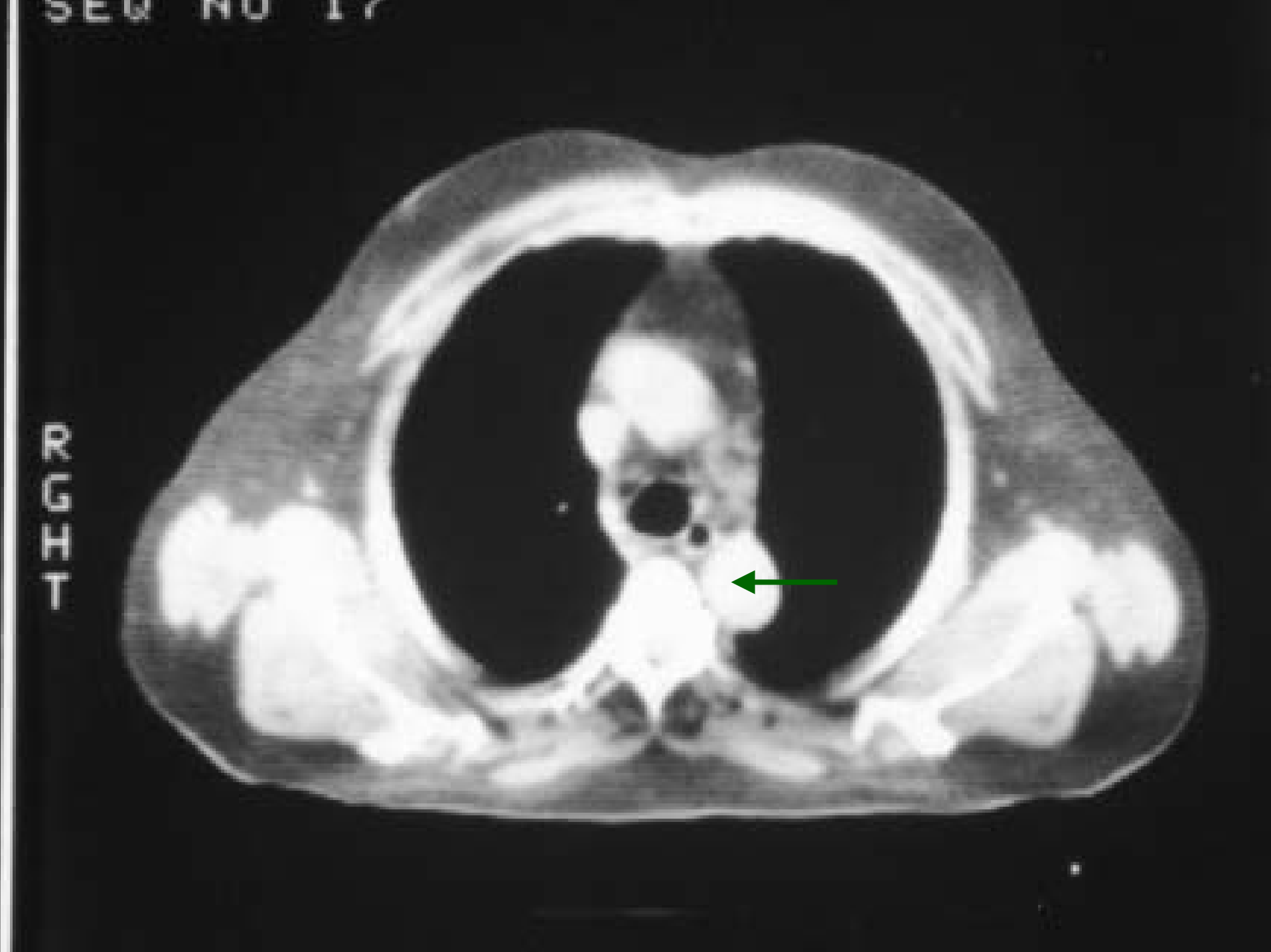
Great Systemic Arteries

Superior branches of aortic arch

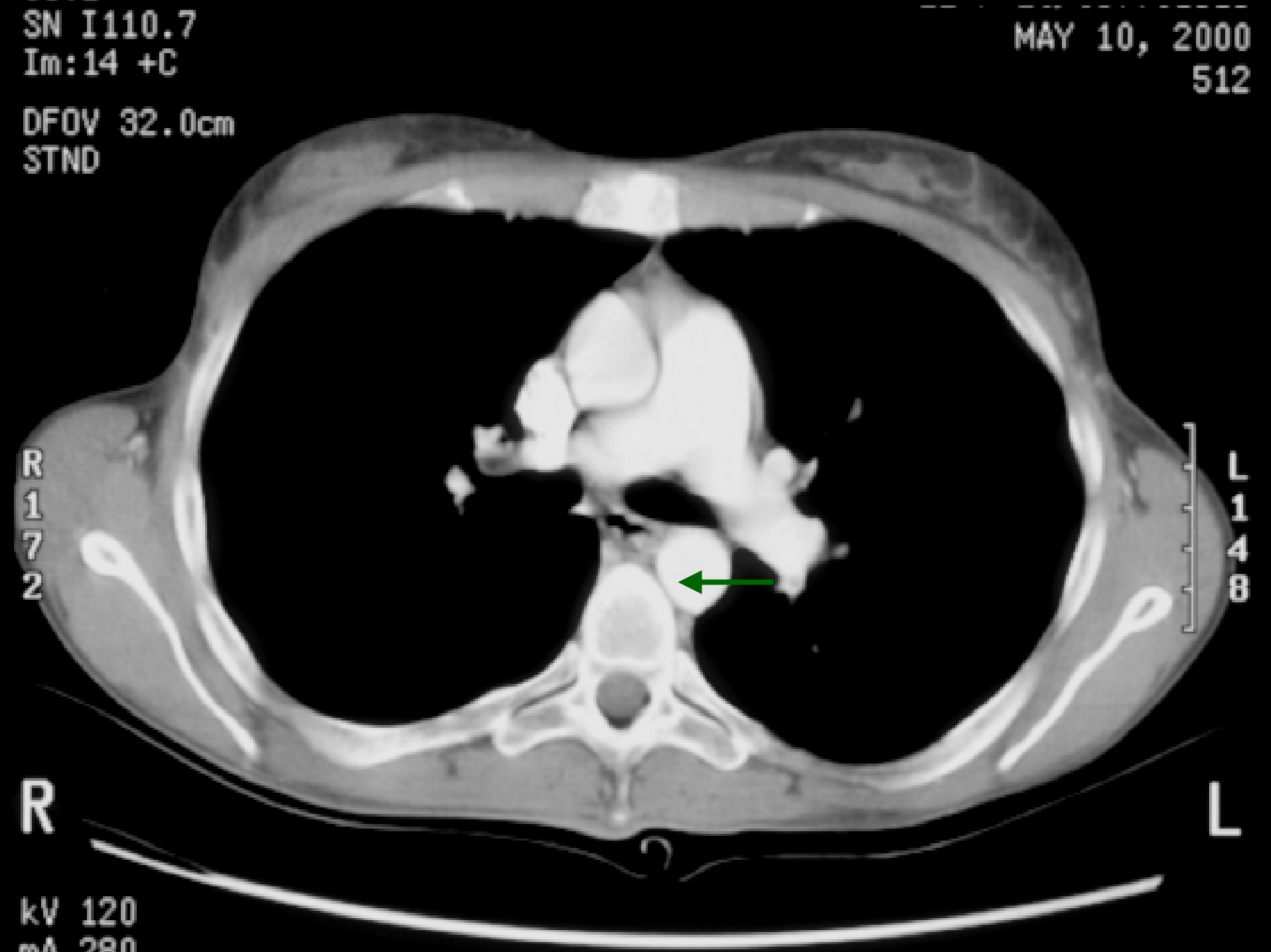
- Brachiocephalic
- Left common carotid
- Left subclavian


SN I68.7
Im:8 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120

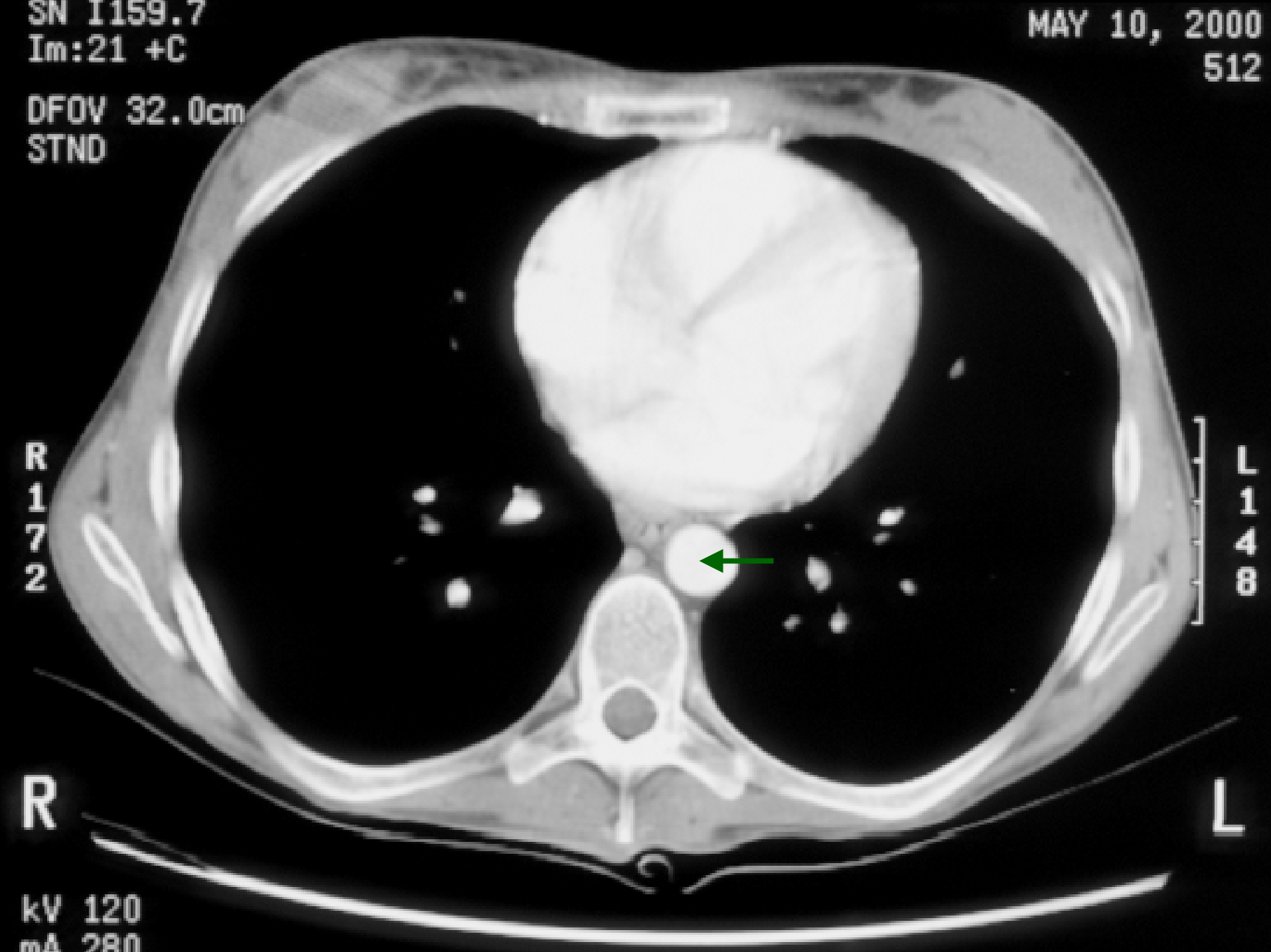

Im:11 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120
mA 280

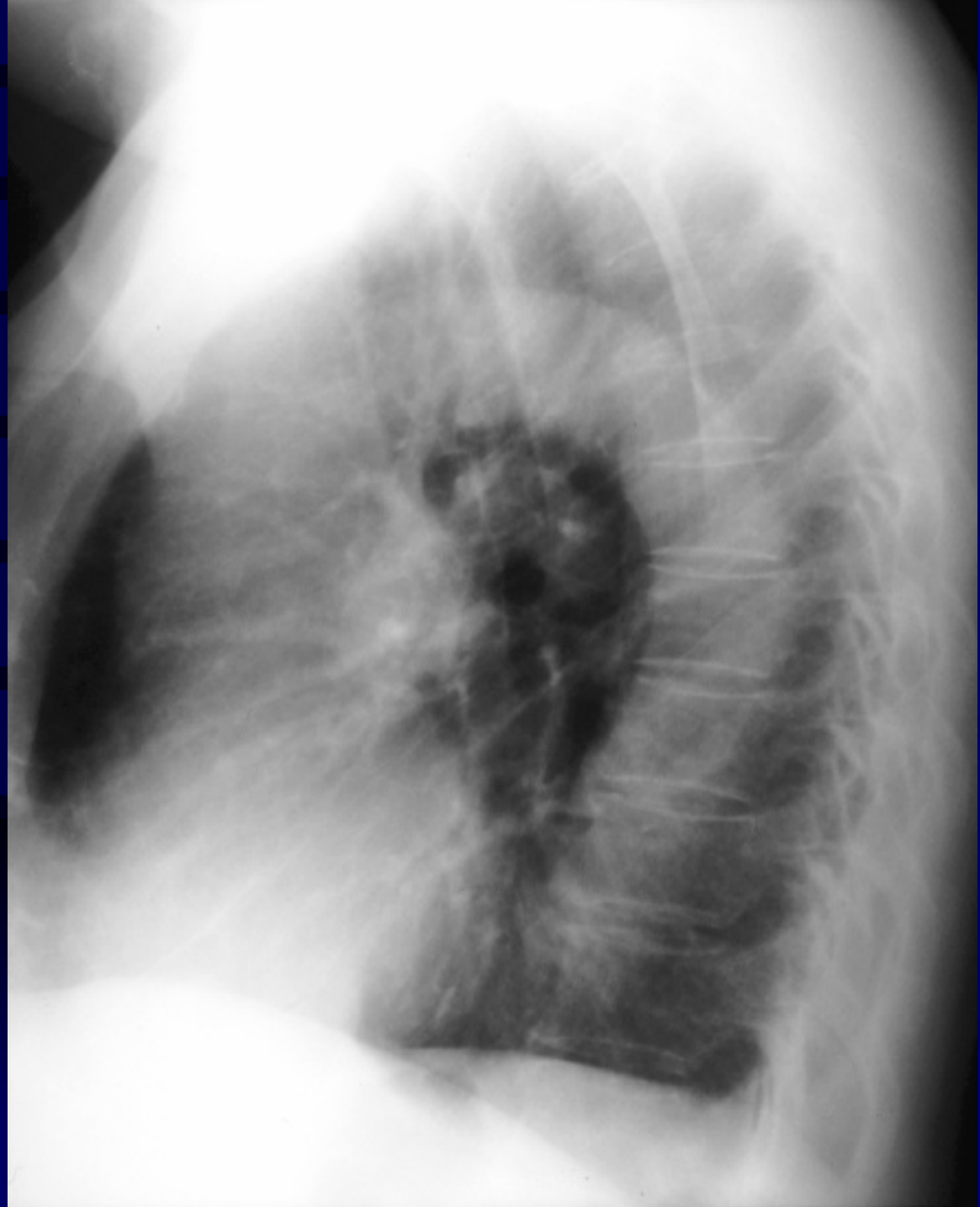

SEQ NO 17
RGHT

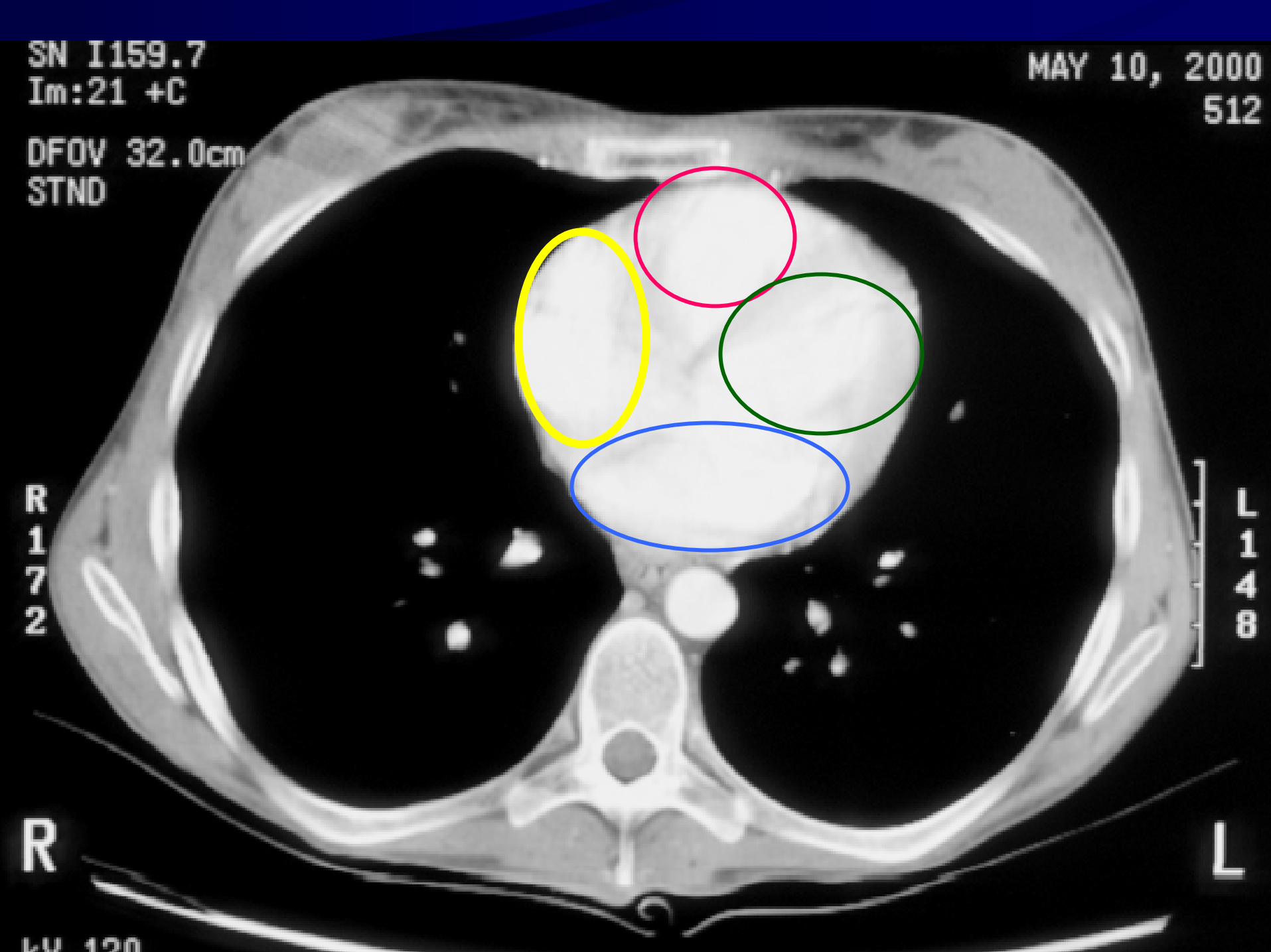

SN 1103.7
Im:13 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120


SN I110.7
Im:14 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120

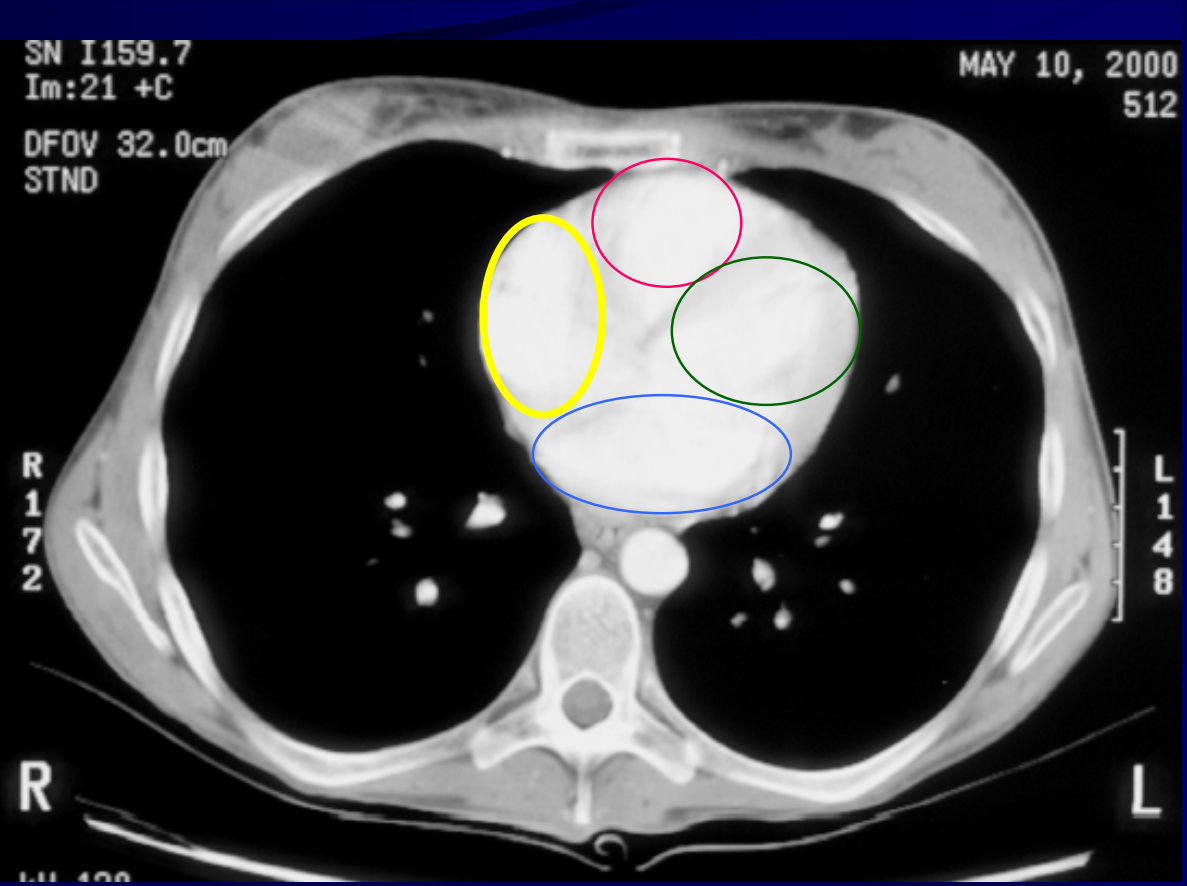

SN I131.7
Im:17 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
172
L
148
R
L
kV 120


SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L
kV 120
mA 280




SN I159.7
Im:21 +C
DFOV 32.0cm
STND
MAY 10, 2000
512
R
1
7
2
L
1
4
8
R
L

Cardiac Chambers



Blood flow always left and anterior